VOL. XXVII NEW YORK—THURSDAY, AUGUST 29, 1912—CHICAGO No. 9

The AUTOMOBILE

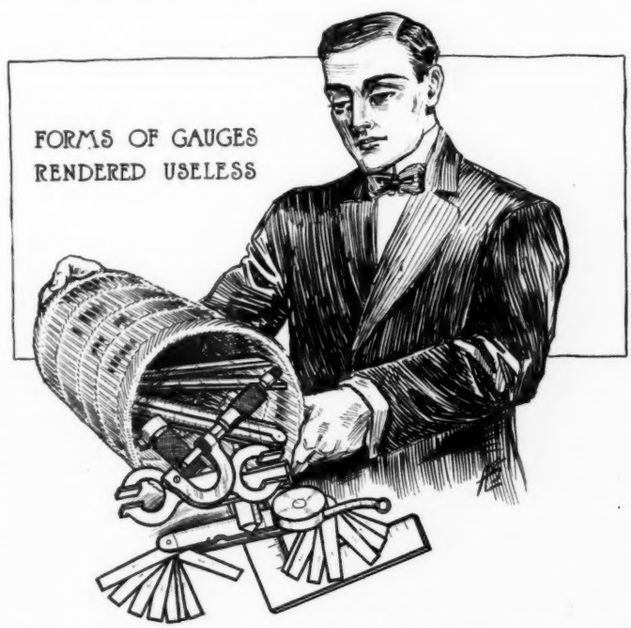
Metric or English Measurements?

Prominent Engineers Representing Some of the Best-Known American Automobile Manufacturing Concerns Express Their Views as to Possibility of Adopting the Metric System

Majority of Engineers Believe That, While System Would Be Advantageous if Adopted, the Enormous Expense Involved Prevents—A Minority Are of the Conviction That Change Could Be Made

Part II

LAST week THE AUTOMOBILE explained at some length the metric system, discussing its history and that of the English system. It was pointed out that the great obstacle in the way of the general adoption of the far more useful and logical metric scheme was the great resistance offered to it by the engineering and commercial fraternity, due to the large expense which the change would incur. This cost would be largely through the necessity for scrapping much valuable machinery, which is based upon the foot and inch system, through the necessity of educating the American workmen to a new system with which they are not familiar and the consequent mistakes which they would make at the start; through the necessity of changing much design which has been worked out with English units and the great amount of work which draughtsmen and designers would have to do to bring about such a change.



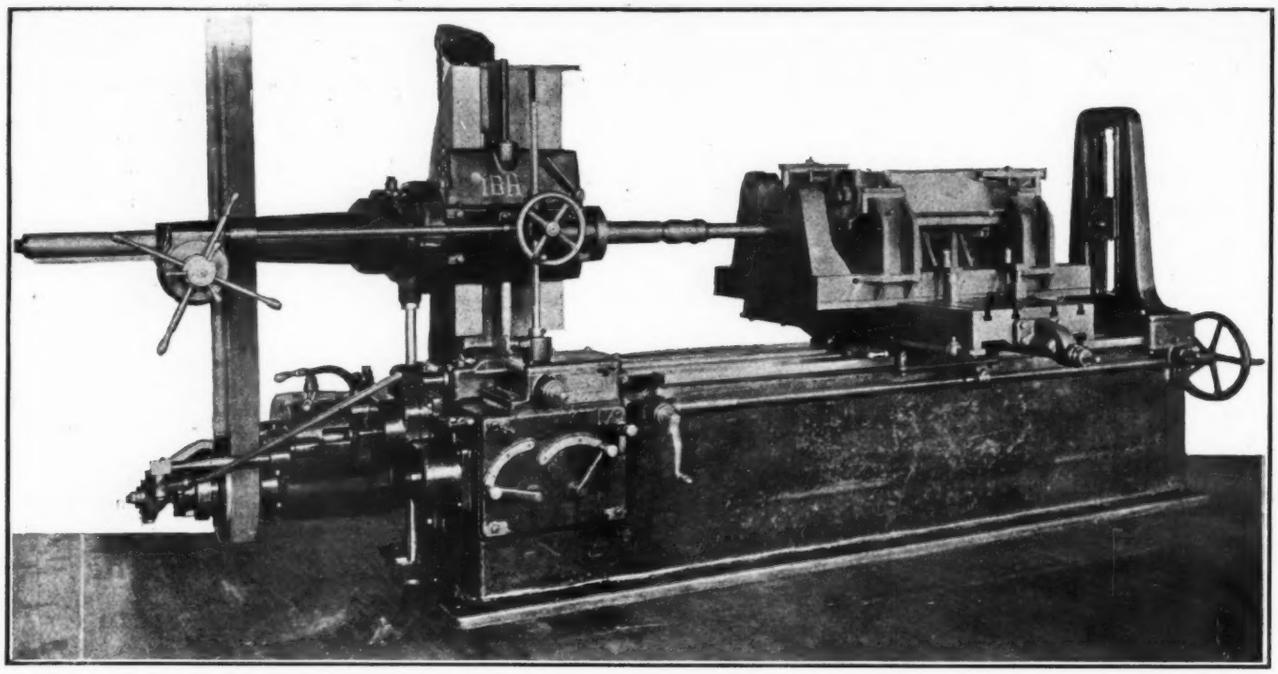
Our micrometers, gauges and measuring instruments would be useless

This week we publish the views of a number of eminent American automobile engineers on the subject, which is a live one with us as a nation to-day. The letters herewith are not all against the general adoption of the metric system by the automobile industry—some come out squarely for it. Others are of the opinion that, once installed, it would be a great benefit to them, both as regards their foreign trade with such countries as have it as a standard system and on account of the time it would save in their engineering departments. Yet many of these men who favor it as a system believe that the cost of its introduction is prohibitive. Others are of the opinion that if all manufacturers would agree after a certain date to use the metric system the system in use at present would soon become obsolete.

It is the opinion of many that should one branch of manufacturing, such as the automobile industry, attempt to arbitrarily adopt as its standard a system which was not generally accepted by all branches, there would be no end of difficulty in getting material on a measurement basis which was at odds with that in general use.

One engineer gives it as his belief that the American car manufacturer will not be handicapped in the export market on account of the variance or difference in measuring systems, even though he acknowledges it to be true that the international nature of the automobile demands a universal scheme of measurement. His letter is given below:

"There is not the least question but what the adoption generally of the metric system would prove convenient in more ways than one. It is true that the international nature



Boring mill and jig used on Stearns-Knight crankcases. Change of setting scale would involve replacement of speed-gear trains

of the automobile demands a universal scheme of measurements. The American automobile manufacturer will not, in my estimation, be handicapped in the export market on account of the variance or conflict in measuring systems. The reason for this belief is that both measuring systems are so well and universally known as to make them easy of comparison and interchangeability in figures at any point in the civilized world.

"Here in America the automobile manufacturer would have to contend with several different things in attempting to adopt the metric system. If the American automobile manufacturers were to adopt the metric system this step on their part would be retroactive on allied industries, meaning all companies now supplying mechanical parts necessary in making up automobiles. These allied industries, while in some instances dealing entirely in automobile products, are still, for the most part, supplying other industries.

"To have, therefore, a successful application of the metric system to our designing and manufacturing, it would be almost necessary to prevail upon different manufacturing industries, railroads and the United States Government to join hands in the movement.

"The changes necessary in manufacturing would be more noticeable, perhaps, in the jigs and fixtures than in the machinery itself, but I do not feel able to say just how great the changes necessary would be."

He, too, believes that for successful adoption of the French system all must join in the movement with the government.

Engineers Favor Metric System

That engineers see the possibilities of, and drawbacks to, the decimal system is evident from the way in which they have met the issue. We are pleased to present their views:

M. H. Roberts, Chief Engineer of the American Locomotive Company, states: "The engineering department of this company favors the use of metric measurements, but finds it a handicap because so few American manufacturers have adopted the metric system. On account of the difficulty of securing material when it is ordered in metric dimensions we were forced during the past year to change our truck drawings from metric to English measurements.

"The use of the metric system is largely a matter of public opinion and if it should come into general use it would be found to be very convenient, but its retention by the manufacturers who have already adopted it in this country depends upon a much more common use of the system than exists at the present time."

Charles Boyden, of the American Motors Company, favors the change. He says in part: "Our engineering staff is strongly in favor of the adoption of the metric system as applied to automobiles. The reasons for this are quite obvious.

"It certainly will, in the writer's opinion, take considerable time to effect a change of this kind, inasmuch as it would necessitate change in all machinery, tools, jigs, etc., and the expense would, indeed, be enormous."

Dual System a Temporary Result

E. Lacey, of the Cunningham Company, thinks that the change would have to be abrupt, as may be seen in the following: "The most serious obstacle in the way of the adoption of the metric system seems to be this one element of cost. Another difficulty of course is that all factories would be required for some years to come to maintain both equipments in their factories so as to be able to supply repairs for machines manufactured under the old system.

"As to how this transition should be made is a very serious question, but it is the writer's opinion that in automobile work it would have to be made abruptly; that is, to jump direct from the old system into the metric, adopting every phase of the new system at the same time. It is the writer's opinion that this would cause less confusion than by adopting the system piecemeal.

"As to changes in factory machinery, it seems to the writer this would be very great. Every machine turning out metric parts such as threads, gears and the like, would have to be arranged for the purpose. This would mean that new machinery would have to be purchased for the purpose. The old machinery would have to remain in service for some considerable time to take care of past work."

T. A. Peck, of the Empire Company, favors the change strongly. He says: "We have no comment to make except that in our opinion the adoption of the metric system of

measurement is as badly needed here in America as the American decimal system of coinage is needed in the old world."

H. Nyberg, President of the Nybert Company, thinks this country is in need of the metric system. He states: "To-day America is rapidly becoming the greatest manufacturing country in the world. She should do everything in her power to develop and increase her industries in legitimate ways. Americans use one system of measurement when most of the civilized world uses another. This puts our salesmen at a disadvantage, for they must translate the measurement on their machines into the foreigner's system in order to make him understand, which entails a loss of time, a loss of money and untold annoyance.

"This might be justified if our system were better than the metric, but it is not. Our British forefathers took the length of an English king's foot as one unit, and the distance between two joints on his forefinger as another, which shows that it has no basis of reason upon which to rest. Moreover, our units do not increase in logical order, but by 12 and 3 and so on.

"No such objections can be made to the metric system. It has but one unit, and then increases and decreases by decimals, thus harmonizing with our number system. The metric system is logical and orderly, and it is my earnest wish that not only American automobile manufacturers would adopt it but also that Congress would make it the standard system of measurements throughout our country."

Missionary Work a Difficulty

F. N. Nutt, Chief Engineer of the Haynes Company, has little doubt but what the metric system would be satisfactory. His views are as follows: "There is no doubt but what the metric system if universally adopted would be all right, but the missionary work and trouble to be encountered by the above adoption would be annoying. The rising generation should be educated to one or both systems and the present day manufacturer would have to shoulder numerous mistakes and delays in trying to educate the present day mechanic. In order to adopt the metric system present factory machinery and tools would have to be changed, gear centers and gear calculations would have to be worked over, as well as gear reduction on lathes and other shop tools in order to cut threads according to the metric system. Each and every mechanic would have to buy new scales and other measuring instruments."

C. P. Brockwar, of the Inter-State Company, believes the change should be made, but he is in no hurry, as may be seen by his remarks, which follow: "Regarding the adoption of metric system in automobile factories, will say that we have no doubt about its benefits, but we believe it will be some time before this change can be made.

"We do not feel that we would care to pioneer in a campaign of this kind, as it will undoubtedly mean a great deal of expense, change of machinery and tools. We do not believe that the American car owners would be pleased with a change of this kind, unless change would be general with all manufacturers, which would be impossible.

"We believe that a gradual change can be made through the automobile engineers by standardizing on one or more parts at a time, to be made to the metric system."

H. G. Farr, Chief Engineer of the Knox Company, believes that the change will take place in the future. He says: "I believe that this is going to come sometime and would much prefer it if we had no past history to contend with.

"Of course, you understand that it would mean a complete re-start from everything, drawings, patterns and jigs, to adopt this system, involving a tremendous expense and about three years' time to make the change. The change in factory machinery he does not believe would be so important other than in jigs and fixtures, with the possible exception of all threading machinery, which of course would have to be changed to the metric pitches.

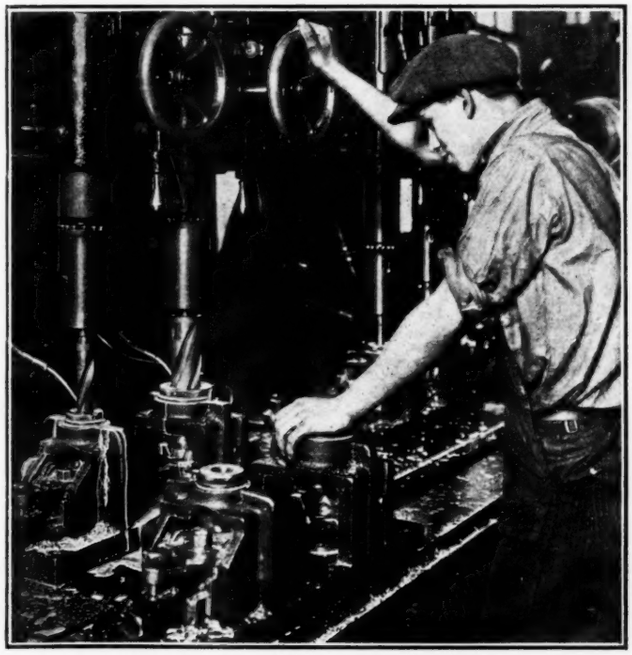
"We do not believe that it would be of any particular benefit to take the metric equivalents of English sizes throughout an automobile and say that you had adopted the metric system. It would not be adopting it, it would be simply English dimensions in metric figures and would involve a great amount of decimal millimeter dimensions which would mean more work."

Thinks Decimal System Superior

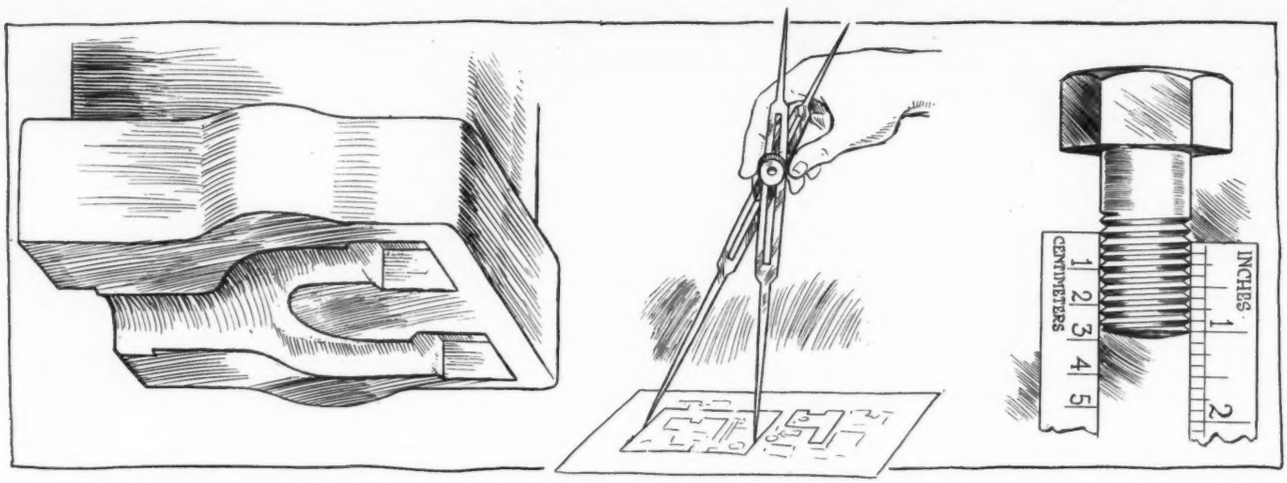
H. J. Edwards, of the Edwards Motor Car Company, sees necessity of fixing a certain date for the change. He states in part: "In my opinion the decimal system of measurement has the same advantages over the English system of yards, feet and inches as the decimal system of coinage has over the English system of pounds, shillings and pence. In the Daimler factory they are using the metric system of measurement entirely, and from what I learned in the shops they did not have very much difficulty when they installed it. I should like to see the decimal system of measurement inaugurated in this country, not only in automobile practice but universally. It is just as easy to talk kilometers, meters and millimeters as it is to talk miles, yards, feet and inches, and with a very little practice it is quite easy to carry in your own mind what these dimensions represent without having to resort to changing them to miles, etc.

"So far as automobile practice is concerned, the only way I can see at present in starting the movement would be that any manufacturer commencing the design of a new model after a certain date would use the metric system. The present system would then gradually become obsolete by elimination. It would be much easier for a company manufacturing all, or the greater portion, of their parts to do this than one who buys their parts and assembles their cars, unless the rule of inauguration would apply not only to automobile concerns, but also to the parts people as well. It is true, it might create considerable confusion for a while, but I am confident that in the end it would be worth while."

Wm. G. Wall, Chief Engineer of the National Company, believes the majority of factories would be willing to make



Drill used on Chalmers connecting-rods. Change would affect drill diameters as well as gear relations, etc.



The introduction of metric standard would necessitate the discarding of English dies, gauges, screw threads and other factory accessories

the change, saying: "I believe that, regardless of the expense and trouble occasioned by the changing from our present system to the metric system, the majority of automobile factories would be willing to do this, provided some agreement could be made whereby the entire industry would within a certain number of years discontinue the present system and take up the metric system exclusively.

"The necessary first steps in beginning a campaign of this kind would be the interesting of the Society of Automobile Engineers and the Automobile Board of Trade in this. If both of these organizations would sanction such a change it could probably be carried through. With either one of these organizations against it, however, it would be almost impossible to change to the metric system in this country."

George T. Handutt, Consulting Engineer of the United States Motor Company, believes the automobile industry too small to swing other forces into line. Part of his statement is: "We do not question for one moment the desirability of metric measures for manufacturing purposes, but we believe that the automobile industry is too small a factor in the industries of the United States to attempt to force the issue, because it has not full control of the situation.

"Let us assume for the moment that the automobile factories acting in concert agreed to adopt the metric measure and incorporate it into their product.

"The first thing would be the enormous loss of equipment in the form of reamers, dies, punches, gear sets and the redesigning of special machinery. This loss in the larger companies might easily exceed one million dollars.

"In the second place the entire working force would have to be instructed in the use of the new measure. Mistakes would be frequent and the delay in producing the product would be serious.

Conversion Would Cause Delay

"Thirdly, additional delay would be entailed and more mistakes by the use of conversion tables from English to metric measure, which would of necessity be used until the period of transition was completed, representing another large loss. Tools and machinery would have to be largely special at first and for a time at least cost a great deal more.

"Finally, many factories which do not come under our control would create further expense; for instance, the size of rods, tubing and stock of various kinds which is now supplied according to inch measure could no longer be selected by these dimensions, but with reference to the nearest metric dimensions, entailing a large amount of machining and waste of material.

"It is a conservative estimate that it would cost large companies not less than two million dollars to make the change.

"Set off against this expenditure and justifying it are convenience and speed of manufacturing which will undoubtedly eventuate in the ultimate. The progress would be by slow degrees and it would be many years before the automobile industry could begin to realize on this investment.

"It is the writer's belief that metric measures can only be introduced into this country by first legalizing them by an act of Congress to the exclusion of all other measures, and set an example by transacting all government business on the metric basis.

"No one industry of which I am aware is capable of forcing the rest of the country into line, and the interdependence of one industry upon another is so great that enormous expenditure without adequate return is entailed in every instance.

Government Adoption Necessary

"The adoption of the metric system in laboratories and places of such character where commercial consideration does not enter is a comparatively easy matter. But in commerce where money is not spent for any consideration except immediate and adequate return the adoption of the metric system is utterly impossible by individual effort, practically impossible by the concerted efforts of an entire industry, however large, and only a matter of very slow probability where it is made a national issue. In France and Germany it was only successfully introduced after government upheaval."

H. C. Stutz, President of the Stutz Company, believes in letting well enough alone. He says: "I am of the opinion that the S. A. E. standard and the A. L. A. M. standard is a mighty good proposition.

"It has grown very successful and has just gotten our screw machine people and tool makers in line, and to adopt some other system and discard the one we have at present does not look as though it was good judgment on an engineer's part."

J. G. Sterling, Chief Engineer of the F. B. Stearns Company, thinks that the benefits would not justify the trouble in making the change. Part of his statement follows: "Replying to your communication of August 6 asking our opinion in connection with the adoption of the metric system will say that my personal inclination would be toward the universal adoption of this system as early as possible, but I do not believe that the benefits to be gained by changing to the metric system as applied to lineal dimensions alone would justify the trouble and inconvenience that would necessarily arise from its adoption at the present time."

G. R. Wadsworth, of the Peerless engineering staff, states that the loss of money in making the change would be too

much. He says: "Changing from the present system to the metric practically means scrapping a great deal of machinery, gauges and other expensive apparatus as well as redesigning all these units. The loss to be encountered is more than American manufacturers care to undertake at this time, or possibly at any time."

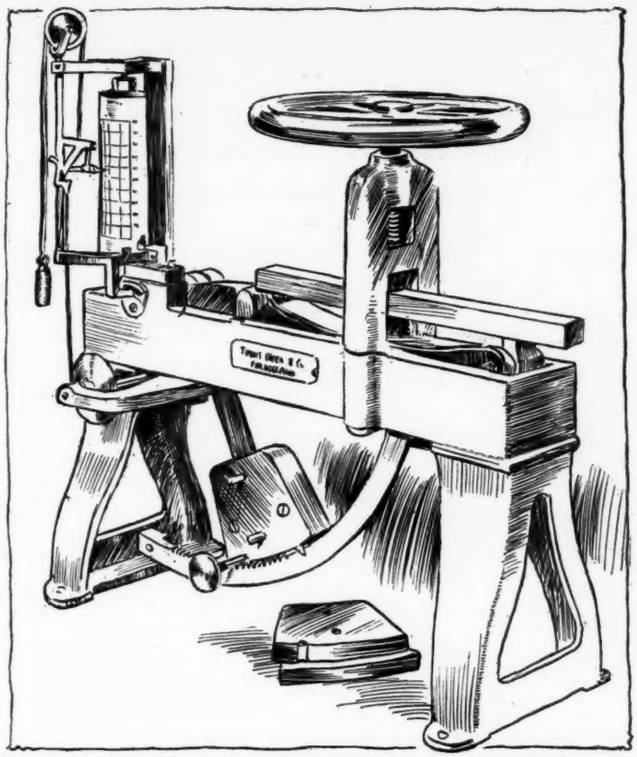
C. B. Rose, Chief Engineer of the Velie Company, does not think that the change could be made by the ordinary manufacturer, as may be seen from the following statements made by him: "Due to existing conditions a considerable length of time would be consumed in putting this system into effect. I believe that the proper way to do this, providing it should be decided to do so, would be to gradually change on all new work going through the factories. That is, if a new design was brought out at any time incorporate the metric system of measurements in this design rather than endeavor to change over on present design.

Benefits Only for Export Trade

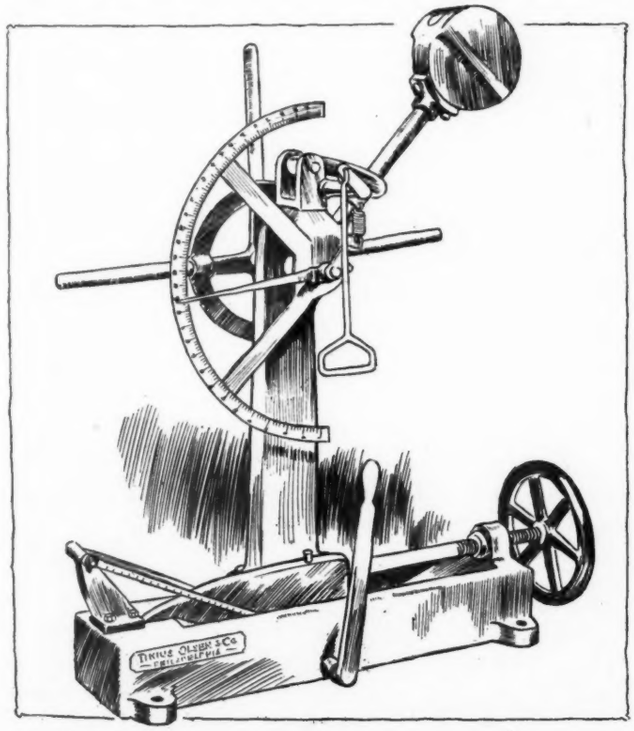
W. H. Callier, General Manager of the Marathon Motor Works, sees benefits only for export trade if change was made. He says: "A few years ago the adoption of the metric system was thoroughly discussed by the American Society of Mechanical Engineers, of which the writer is a member. The objections made by the society to the adoption of the metric system at that time, we believe, hold good in the construction of automobiles. We do not see how the adoption of this system would be of any benefit to our cars other than those exported."

P. W. Klinger, a Speedwell engineer, says: "My personal feeling is that the metric system would be a very desirable one if used universally. One of the largest objections we can see to it would be first, the very large number of changes which would be necessary in machine tools and equipment and all measuring apparatus, and secondly, the endless amount of confusion which would necessarily take place in the transition period from the old to the new method of gauging.

"For the automobile world it would seem that the S. A. E. should, after due deliberation, decide upon a period of time in which the change should be made, say two or three years, during which time all new drawings produced could be worked on the new standard with the old figures given as a check up to the expiration of the transition period."



Transverse tester for cast bars graduated for English measurements



Impact testing machine adapted for metric and English units

W. H. Vandervoort, of the Moline Company, thinks the change would be a foolhardy undertaking. He says: "The first question I would naturally ask is, 'What are the advantages when our present system is so thoroughly installed?' The great mistake made by the engineers of this country was that they did not adopt the metric system as to the desirability of the system, but when you stop to consider what it would mean to adopt it at the present time I feel that it would be a foolhardy undertaking.

"Think of the widespread campaign of education that would have to be started in order to get our workmen to a point where they could intelligently handle this system. It would be many, many years before the English system could be entirely discarded, and during that time of necessity both systems would have to be used in all factories, or at least so long as their was possibility for call for repairs for product that had been delivered."

G. G. Behr, of the Hudson Motor Car Company, doubts if any real benefit would arise from the change. He says: "I have talked this over with the heads of the various departments of our company who would be interested in such a change and from our standpoint a change of this sort would not seem advisable for various reasons. To begin with, it would take years to work it out properly, during which time there would, undoubtedly, be considerable confusion. It would, no doubt, to a great extent interfere with the operation of our service and repair departments and in view of the fact that practically all of our parts are built by outside concerns we would, no doubt, experience great difficulty in getting them into line.

"Taking all these points into consideration, it is a question in my mind whether or not any real benefit would be derived by changing to the metric system, owing to the numerous difficulties which we would undoubtedly encounter if such a change were attempted."

Where the Trucks Are

National Association of Automobile Manufacturers Presents Tables Showing Distribution

Geography, Population, Paved Streets and Roads Are Considered as Relative Factors in the Problem

ONE of the most remarkable compilations ever made since the beginning of the automobile industry is the following series of three tabulations and explanatory notes and conclusions sent out by the National Association of Automobile Manufacturers covering the geographical distribution of automobile trucks and its relation to population and improved streets and roads.

Due credit is given by the association for the painstaking effort used by *The Commercial Vehicle* in collecting the data upon which the tabulations are based, but the association elaborated upon the tables and introduced a mass of data upon which the conclusions drawn in the accompanying article had their foundation.

Scrutiny of the tables shows that there are certain spots in the United States where population and roads would seem to warrant a wider use of the commercial car where the showing is not favorable. These sections deserve the attention of manufacturers. Other states and districts have a considerable excess of motor equipment which may be accounted for on the hypothesis of unusual local conditions. In Oregon for instance the horticultural and mining industries in connection with the wide use of trucks in the city of Portland bring the state to a rank above Connecticut in the number in use. Where such conditions exist it might be possible to utilize that fact to advantage.

New York's showing is interesting. The Empire State ranks first in number of trucks, total population, and in the number of residents who live in cities of and above 25,000. It is also first in the number of miles of paved streets in the cities.

But in the matter of improved country roads it is behind Indiana and Ohio. If this condition proves anything, it shows that street pavement is a more important element in truck use than the improvement of country roads; thus indicating that the truck at present is a creature of the city. This, however, is not borne out by a digest of all the figures. Good roads and streets are required for advantageous operation, but they have to be considered together in order to justify an intelligent opinion or conclusion.

The other side of the proposition is shown in California where the percentage of paved streets is 50 and of improved roads 17.87, while New York is 54 and 16.13 per cent., respectively. The percentages of paved streets in both states is not dissimilar, considering the fact that the city of New York is included in the tabulation. The improved country roads are proportionately more numerous in California than in New York and the ratio of automobile trucks per 1,000 of population is greater in California than New York. Considered on the basis of city streets this ought to be reversed, but the difference is made up in the excess of good country roads; thus proving that both elements are required in reaching the correct conclusion.

The states south of the Ohio River, particularly Kentucky and to a lesser degree Tennessee, where the percentage of improved country roads to total roads is higher than their respective ranks in population, show a marked deficiency in the normal number of trucks. There is an immense amount of work in Kentucky and Tennessee that could be shifted to the automobile truck and on the poor showing in each state it would seem that a market for more trucks might be cultivated.

Such efforts as that, however, call for combative marketing.

TABLE 1—SHOWING RELATION OF DISTRIBUTION OF MOTOR TRUCKS TO POPULATION AND GOOD ROADS.

State.	Number of Commercial Motor Vehicles in Use in 1912.	Population of State in 1910.	Population per Square Mile.	Population in Cities of 25,000 and Upwards.	Miles of Improved Roads in Country 1909.	Miles of Paved Streets in Cities of 30,000 and Up in 1907.
New York	7,892	9,113,000	191	6,355,280	12,787	2,952
Pennsylvania	2,664	7,665,000	171	3,015,161	3,365	2,154
Illinois	2,551	5,638,000	101	2,624,656	8,914	1,947
California	2,198	2,377,000	15	1,095,120	8,587	1,066
Massachusetts	2,045	3,366,000	419	2,155,475	8,463	1,912
Ohio	1,171	4,767,000	117	1,784,210	24,106	1,643
Michigan	1,146	2,810,000	49	939,929	6,900	687
New Jersey	1,080	2,537,000	338	1,368,927	3,377	687
Indiana	970	2,700,000	75	479,071	24,955	482
Minnesota	970	2,076,000	26	594,618	5,417	326
Missouri	832	3,293,000	48	1,080,087	4,755	1,119
Iowa	730	2,225,000	40	330,092	2,505	253
Wisconsin	580	2,333,000	42	592,885	10,167	590
Oregon	526	673,000	7	207,214	2,799	292
Connecticut	519	1,115,000	231	484,034	3,030	389
Rhode Island	410	543,000	508	367,851	1,042	377
Texas	382	3,897,000	15	473,375	4,892	358
Maryland	371	1,295,000	130	558,485	2,142	506
Colorado	239	799,000	8	286,854	320	118
Nebraska	220	1,192,000	15.5	194,328	249	167
Dist. of Columbia	218	331,000	5,518	331,069	.....	325
Utah	181	373,000	4.5	118,357	1,018	14
Washington	170	1,142,000	17	450,153	4,520	170
Georgia	155	2,609,000	44	301,608	5,978	249
Kentucky	146	2,290,000	57	352,607	10,114	354
Kansas	120	1,691,000	21	178,465	374	122
Virginia	100	2,062,000	51	292,638	1,903	191
North Carolina	96	2,206,000	45	59,762	2,313	.....
South Dakota	96	584,000	8	.....	286	.....
Florida	83	753,000	14	95,481	1,752	54
Maine	78	742,000	25	109,421	2,703	115
Delaware	78	202,000	103	87,411	186	59
Tennessee	78	2,185,000	52	322,419	5,353	427
South Carolina	54	1,515,000	50	85,152	3,534	36
Arkansas	51	1,574,000	30	69,919	1,085	25
Alabama	48	2,138,000	42	222,342	3,264	118
New Hampshire	48	431,000	48	96,068	1,448	29
North Dakota	46	577,000	8	.....	140	.....
Louisiana	44	1,656,000	36.5	367,090	329	222
Oklahoma	42	1,657,000	24	89,483	361	40
Mississippi	36	1,797,000	39	.....	342	.....
Montana	34	376,000	3	39,165	95	3
Vermont	34	356,000	39	.....	2,650	.....
West Virginia	32	1,221,000	51	72,802	591	32
New Mexico	29	327,000	3	.....	104	.....
Wyoming	28	146,000	1.5	.....	416	.....
Nevada	26	82,000	.7	.....	46	.....
Idaho	22	326,000	4	.....	510.5	.....
Arizona	21	204,000	2	.....	273	.....

The districts where an excess of trucks is indicated embrace localities where the use of trucks is common and their worth has been demonstrated. It would appear as if the marketing of more trucks in those localities would work out by following the line of least resistance.

Take the farming state of South Dakota, for example. The state has several big railroads, but it is so large that they appear rather inadequate. It has no big cities and ranks thirty-sixth in population. It is a state of seasons. When the harvests are made there is intense activity to get to market. The state ranks twenty-ninth in the number of automobile trucks and only 1-2 mile in every 100 of its highways has been improved.

After a prolonged dry spell such as generally follows the harvest, the roads are passable for trucks and the pressure of freight originating on the farms calls into service every available means of transportation. These facts account for the excess of trucks in South Dakota under all the conditions. When road improvement is extended the demand for trucks should be much larger in such territory as that represented by that state.

Close study of the three tables will disclose scores of interesting facts about truck distribution as the data is sufficiently detailed to allow of some close approximations of actual facts.

Following is the complete article:

The controlling factors in the geographical distribution of motor trucks are somewhat complex. Interesting results have been obtained in an effort to trace some of the principal factors, as shown in the accompanying tables.

It has been said that the motor truck is essentially a good roads proposition and consequently an attempt was first made to show a direct relation between the number of commercial motor vehicles in each of the

States and the total mileage of good roads in the States. The result indicated that some other factor had a greater influence on distribution. It was assumed that this must be population, and therefore the total population of the States and the population of each State per square mile were compared with the number of trucks in each State. The result was better this time, but still not up to expectations. Hence the conclusion was reached that, as large cities are known to be the centers of motor trucking, there must be a closer relation between the number of trucks in a State and the number of people living in large cities in the State.

This was found to be the case, but an ever closer relation is shown between the number of trucks and the number of miles of paved streets in such cities, so that the final conclusion is that the use of trucks is dependent in greatest degree upon the number of people living in large cities and the condition of the streets in such cities. It is evident, however, that there are still other influences having important effects, such as the temperament and occupations of the people and the degree of prosperity of the communities.

Referring to Table 1, the figures relating to the vehicles in use were compiled by *The Commercial Vehicle* from three principal sources of information—production as reported directly by manufacturers to March 1, 1912, State and city registrations of motor vehicles, and reports of trucks in use in the principal cities by reliable observers and well-informed

TABLE 2—SHOWING STANDING OF STATES IN NUMBER OF MOTOR TRUCKS, POPULATION AND MILES OF GOOD ROAD

State.	Rank in Number of Motor Trucks.	Rank in Total Population.	Rank in Population per Square Mile.	Rank in Population in Cities of 25,000 and Up.	Rank in Miles of Improved Roads.	Rank in Miles of Paved Streets in Cities of 30,000 and Up.
New York	1	1	6	1	3	1
Pennsylvania	2	2	7	2	18	2
Illinois	3	3	11	3	6	3
California	4	12	36	7	7	7
Massachusetts	5	6	3	4	8	4
Ohio	6	4	9	5	2	5
Michigan	7	8	18	9	9	8
New Jersey	8	11	4	6	17	9
Indiana	9	9	12	14	1	13
Minnesota	10	19	30	10	11	18
Missouri	11	7	19	8	14	6
Iowa	12	15	25	21	24	21
Wisconsin	13	13	23	11	4	10
Oregon	14	35	42	27	21	20
Connecticut	15	31	5	13	20	15
Rhode Island	16	38	2	17	31	11
Texas	17	5	37	15	13	16
Maryland	18	27	8	12	26	11
Colorado	19	32	39	25	40	28
Nebraska	20	29	35	28	43	26
Dist. of Columbia	21	43	1	20	..	19
Utah	22	41	43	30	32	38
Washington	23	30	34	16	15	25
Georgia	24	10	22	23	10	22
Kentucky	25	14	13	19	5	17
Kansas	26	22	33	29	36	27
Virginia	27	20	15	24	27	24
North Carolina	28	16	21	39	25	..
South Dakota	29	36	40	..	41	..
Florida	30	33	38	33	28	32
Maine	31	34	31	31	22	30
Delaware	32	47	10	35	44	31
Tennessee	33	17	14	22	12	14
South Carolina	34	26	17	36	16	34
Arkansas	35	25	29	38	30	37
Alabama	36	18	24	26	19	29
New Hampshire	37	39	20	32	29	36
North Dakota	38	37	41	..	45	..
Louisiana	39	24	28	18	39	23
Oklahoma	40	23	32	34	37	33
Mississippi	41	21	26	..	38	..
Montana	42	40	45	40	47	39
Vermont	43	42	27	..	23	..
West Virginia	44	28	16	37	33	35
New Mexico	45	44	46	..	46	..
Wyoming	46	48	48	..	35	..
Nevada	47	49	49	..	48	..
Idaho	48	45	44	..	34	..
Arizona	49	46	47	..	42	..

persons. These figures show a total of nearly 30,000 commercial vehicles in use, which correspond fairly closely with the results of the statistical investigation into production and sale made by the National Association, and are believed to be the most reliable figures available showing the distribution of trucks by States.

The population figures and percentages were taken from the United States Census report for 1910. The mileages of improved roads and the percentage of improved roads to total miles of roads in the various States are from a report for the year 1909 by the United States Office of Public Roads and relates solely to country roads that have been graded, drained and hard surfaced or treated with some preparation. The mileages of paved streets in cities of 30,000 population and upward are from the Census report of 1907, the figures for 1909 being now in course of preparation and not yet available.

Examination of Table 1 shows that, while New York State, which heads the list with 7,892 trucks, has the largest total poulation, the largest population in cities of 25,000 and up, and also the largest mileage of paved streets in cities of 30,000 and up, it has an average of only 191 persons per square mile as compared with 508 in Rhode Island, 419 in Massachusetts and 338 in New Jersey, and has only 12,787 miles of improved country roads against 24,955 miles in Indiana, 24,106 in Ohio and more than 10,000 miles each in Wisconsin and Kentucky. On the other hand, California, which ranks fourth with 2,198 trucks, stands twelfth as regards total population, with 2,377,000, and numbers only 15 persons per square mile, but nearly one-half its population lives in cities of 25,000 or more, and it stands seventh in miles of improved country roads and miles of paved city streets. Again, Texas, with a population of 3,897,000 and 4,896 miles of good roads, is credited with only 382 trucks, whereas on these two factors alone it should have more than Missouri, with her 832 trucks. But, on examination it will be seen that only 473,375 of her great population live in cities of any size and that there are only 358 miles of paved streets in those cities, while practically one-third of Missouri's people live in cities and the cities have 1,119 miles of paved streets.

In order to render such comparison easier, Table 2 has been prepared. This shows the rank or standing of each State in each of the factors mentioned, and it is necessary only to follow across the line after each State to determine whether it has its full quota of trucks in proportion to population and good roads and streets. Examination will show, as already stated, that the most direct relation is found between the rank in actual number of trucks and the rank in population in cities and the paved streets in the cities; that is, between columns one, four and six.

Thus, it appears that those States having a normal quota of trucks, or in which the distribution is about uniform with city population and street paving, are New York, Pennsylvania, Illinois, Massachusetts, Ohio, Michigan, Connecticut, Rhode Island, Texas, Georgia, Maine, South Carolina, Montana, New Mexico, Nevada, Washington and Delaware.

Those States having an excess of trucks above normal are California, Indiana, Nebraska, Utah, Iowa, Oregon, Kansas, Arkansas and Florida.

Those having deficiencies are New Jersey, Missouri, Washington, Maryland, Kentucky, Virginia, West Virginia, Tennessee, Alabama, New Hampshire, Louisiana and Oklahoma.

Evidently, local conditions affect the situation in most of the abnormal States. Take Tennessee, for example. It has less than two-thirds as many trucks as it should have to be on a basis with the normal States. This may be accountable for on the ground of comparative backwardness in industrial and commercial progress or because the field has not been cultivated sufficiently by the truck manufacturers' agents. Louisiana is another instance, due perhaps to temperamental and industrial factors. Where blanks occur in the fourth and sixth columns they indicate that there are no cities in those States having 25,000 population in 1910.

The percentages in Table 3 show almost the same results as the relative standing in the States on the basis of actual numbers in Table 2. In explanation of this table, California has 92½ per cent. of one motor truck to each 1,000 inhabitants, giving it the largest number of trucks to population. Forty-seven per cent. of her people live in cities of 25,000 and up, giving her fifth place in this respect. Of her total road mileage, nearly 18 per cent. has been improved, and just half of the street mileage in cities of 30,000 and up had been paved up to the year 1907. Louisiana has an average of less than one truck to 37,000 inhabitants, as compared with nearly one truck to 1,000 in California.

TABLE 3—PERCENTAGES SHOWING RELATION OF MOTOR TRUCKS TO POPULATION AND GOOD ROADS

State.	Per Cent. of Trucks to Each 1,000 of Population.	Per Cent. of Population in Cities of 25,000 and Up.	Per Cent. of Improved Country Roads to Total Roads.	Per Cent. of Paved Streets in Cities of 30,000 and Up.
New York	86.6	71	16.13	54
Pennsylvania	34.7	39.3	3.84	55
Illinois	45.2	47	9.47	38
California	92.5	47	17.87	50
Massachusetts	60.7	65	49	61
Ohio	24.5	35	27.13	50
Michigan	40.8	30.7	10	46
New Jersey	42.5	54	22.76	56
Indiana	36	17	36.7	42
Minnesota	46.7	28.6	6.83	17
Missouri	25.3	32.8	4.4	54
Iowa	32.8	16	2.45	19
Wisconsin	24.8	25	6.64	56
Oregon	78.1	30	9.49	37
Connecticut	46.5	45	24.08	50
Rhode Island	75.5	68	49.14	80
Texas	9.8	12	3.8	26
Maryland	28.6	43	12.77	92
Colorado	30	36	1.08	8
Nebraska	18.3	16	.31	24
Dist. of Columbia	65.8	100	.....	72
Utah	48.5	32	12.23	4
Washington	14.8	41.5	13.19	6.7
Georgia	5.9	11.5	7.27	48
Kentucky	6.3	11	18.82	64
Kansas	7.9	10.5	.38	16
Virginia	4.8	15	4.38	61
North Carolina	4.3	2.7	4.79	..
South Dakota	16.4	....	.5	..
Florida	11	12.5	9.97	40
Maine	10.5	14.7	10.59	80
Delaware	38	43.2	6.22	63
Tennessee	3.5	14.7	11.66	46
South Carolina	3.5	5.5	11.02	51
Arkansas	3.2	3	2.97	13
Alabama	2.2	10	6.58	22
New Hampshire	11.1	22.2	9.58	14
North Dakota	8	....	.23	..
Louisiana	2.6	22	1.32	41
Oklahoma	2.5	5.5	.5	17
Mississippi	2	....	.86	..
Montana	9.4	10.4	.41	3
Vermont	9.5	....	18.4	..
West Virginia	2.6	6	1.84	50
New Mexico	8.9	....	.61	..
Wyoming	19.1	....	3.94	..
Nevada	31.7	....	.36	..
Idaho	6.7	....	2.77	..
Arizona	10.3	....	4.56	..

Trade News of the Week

Petition In Involuntary Bankruptcy Is Filed Against King Motor Car Company—Liabilities Are $304,000

Rubber Market Lively—Standard Oil Explains Recent Continued Rise of Gasoline Prices

MERCHANDISE creditors of the King Motor Car Company, of Detroit, held a meeting in that city last week, elected a creditors' committee consisting of Messrs. Mallory, Oglesby and Hayes and seriously considered the matter of the company's finances.

Sidney S. Meyers, of New York, was selected as counsel for the creditors' committee and after viewing the situation from the standpoint of the creditors, Mr. Meyers advised immediate bankruptcy proceedings.

A petition in involuntary bankruptcy was drawn up under the direction of Mr. Meyers and was placed in the hands of Detroit legal representatives for formal filing in the United States District Court.

The investigation of the creditors, according to Mr. Meyers, disclosed the fact that the total claims against the company amount to about $304,000. Of this amount $100,000 is represented by the claim of Artemus Ward, of the advertising company Ward and Gow, and said to include loans of money as well as merchandise claims.

The assets of the company are rated as material of a book value of $150,000 and accounts receivable of $15,000. The material consists of parts of automobiles, but the stock on hand is not sufficient to make up complete cars unless certain deficiencies are supplied. The creditors estimated that it would be necessary to advance from $175,000 to $200,000 in order to make up 250 cars. This course was not favored and upon the recommendation of Mr. Meyers, steps were taken to institute bankruptcy proceedings.

In addition to the list of assets the company also has a lease upon the buildings which constitute its present plant.

DETROIT, MICH., Aug. 28—A petition in involuntary bankruptcy has been filed in the United States District Court, Eastern District of Michigan, against the King Motor Car Company. The petitioning creditor is the Harvey Manufacturing Company and the claim in suit amounts to about $1,100.

Rubber Easier in Lively Market

The bulge of crude rubber prices which carried the market up to a basis of $1.25 per pound for up-river fine was reduced after the commencement of the fortnightly auction in London. The prices obtained at the plantation sale were only slightly lower than those current 2 weeks ago but the total offerings were 725 tons, of which about 300 were sold on the block. A better local demand was apparent in the market with some buying that appeared to be for manufacturers.

Old Contracts Disturb Gasoline

Owing to the series of advances that have been noted in the market for gasoline during the past 8 months, prices have been badly demoralized in various sections of the country. Reports have been received that approximately the same grade of gasoline is available in Ohio and several adjacent states in the Middle West at 13 cents a gallon as can be obtained in New Jersey at 18 cents, New England in spots at 17 cents and New York City at 25 cents.

The Standard Oil Company of New York declares that it buys gasoline in Cleveland at the refinery at 17 cents a gallon and that the retail price of gasoline of the same grade in New York City is 19 3-4 cents a gallon f.o.b. New York in wooden barrels of 50 gallons capacity. Parenthetically, the Standard Oil Company explains that the grade of gasoline known as 68-70 degrees forms very little of the total amount sold and used for automobile fuel. The grade used for automobile fuel is known as motor or stove gasoline and the degree is not given.

The wholesale price of gasoline quoted by the Standard Oil and Texas companies in New York and f.o.b. New York for shipment elsewhere in steel barrels, the barrels to be returned immediately upon delivery is 16 cents a gallon.

The apparent paradox contained in the figures is explained as follows: Last year in July and before garagemen and big users and dealers in gasoline entered into contracts with the manufacturers of gasoline, the Standard Oil Company, Texas Company and others, at the level current at that time. Some of these contracts are still in effect with thousands of gallons of gasoline still to be received by the contracting purchasers at the same price that was in effect in July, 1911. In turn, some of these garagemen contracted with customers to supply them with gasoline at a certain figure and despite the repeated advances they have kept on selling at the original price not only to the customers with whom they have contracts, but also to their trade generally.

When their contracts expire, they will have to be renewed at the contract price that is current at the time of the renewal.

"Overlooking a chance to make hay while the sun shines," is the way headquarters of the big oil companies view the action of the garagemen.

When asked as to the significance of the epigram, an official of one of the companies said that in view of the big jump in the market price of gasoline, the customers who made contracts at low figures should have had a nice fat profit at the expense of the sellers instead of handing over the profit to their general trade, thus demoralizing prices and causing confidence to waver.

As to the permanence of the present level, or a gradual appreciation in prices, the opinion prevails that high prices have

Automobile Securities Quotations

Automobile securities had another quiet week in the markets. Goodrich issues have been listed on the New York Stock Exchange and the common has been strong for a week. General Motors continues to gain slowly but steadily. U. S. Motor has been active within a narrow range.

	1911 Bid	1911 Asked	1912 Bid	1912 Asked
Ajax-Grieb Rubber Co., common	..	..	145	165
Ajax-Grieb Rubber Co., pfd.	..	..	95	100
Aluminum Castings, preferred	..	..	99	102
American Locomotive, common	38	38¼	45½	46
American Locomotive, preferred	106	107	109	110
Chalmers Motor Company	..	..	..	..
Consolidated R. T. Co., common	5	10	16	18
Consolidated R. T. Co., preferred	10	20	50	59
Firestone Tire & Rubber Co., common	179	181	284	288
Firestone Tire & Rubber Co., pfd.	105	107	106	108
Garford Company, preferred	..	..	..	..
General Motors Company, common	42	43	38½	40
General Motors Company, preferred	80	82	79¾	81
B. F. Goodrich Company, common	243	245	76¾	77¼
B. F. Goodrich Company, pfd.	118¾	119¾	107½	108
Goodyear Tire & Rubber Co., common	230	240	330	335
Goodyear Tire & Rubber Co., pfd.	105	107	106	107½
Hayes Manufacturing Company	..	..	..	97
International Motor Co., common	..	..	27½	28½
International Motor Co., pfd.	..	..	84	85
Lozier Motor Company	..	..	80	60
Miller Rubber Company	..	..	142	150
Packard Motor Co., preferred	..	..	105½	107
Peerless Motor Company	..	..	..	120
Pope Manufacturing Company, common	42	46	38	39
Pope Manufacturing Company, pfd.	72	77	73	74
Reo Motor Truck Company	8½	10	9¾	10¼
Reo Motor Car Company	23	25	23	25
Studebaker Company, common	..	..	43	44
Studebaker Company, preferred	..	..	94	95½
Swinehart Tire Company	..	..	95	97
Rubber Goods Company, common	..	..	100	105
Rubber Goods Company, preferred	..	..	107	110
U. S. Motor Company, common	30	32	4½	4¾
U. S. Motor Company, preferred	70	71	17	17½
White Company, preferred	..	..	107½	..

come to stay and that the maximum price has not been reached.

"The facts in the case," said a Standard Oil official, "are that the emphatic demand of the hour is for gasoline. We can sell all we can get. The other petroleum products do not keep pace with gasoline as to demand. The solution of the problem lies in the discovery of some means by which the other petroleum products can be utilized as automobile fuel. The present investigation of the carbureter question is being followed by this company with much care and attention."

The situation in a nutshell is that the rate of 16 cents a gallon may be regarded as basic. The variations from that level are the results of local conditions, but as a general thing the rate in any given locality is about 12 1-2 cents plus the freight or transportation charge from the refinery to any given field. The price of 17 cents paid by the Standard Oil Company of New York at the Cleveland refinery includes the freight charges and contemplates 68-70 degree gasoline. This might account for the considerable difference in price noted.

Peil Is Mitchell Sales Manager

RACINE, WIS., Aug. 26—Leo A. Peil, president and general manager of the Mitchell Automobile Company, a large distributor for the Mitchell-Lewis Motor Car Company, of Racine, Wis., has been appointed general sales manager of the Mitchell-Lewis company to succeed William L. Day, who has resigned to accept the position of general manager of the General Motors Truck Company, Pontiac, Mich. Mr. Peil assumes his new duties on September 1.

Fiat Announces $500 Cut in List

Horizontal reductions of $500, applying to types 56, 55 and 54 which are the 50-horsepower six, the 55-horsepower four and the 35-horsepower, four-cylinder cars have been announced by the Fiat Automobile Company. The standard prices now established are $5,000, $4,500 and $4,000 for the three models respectively.

Market Changes for the Week

Small gains in tin and lead were the only developments in the metal market, these being strong. Copper was quiet. Steel continued at its old prices. Oils and lubricants also remained unchanged throughout the week, and the same applies to gasoline which still sells at 21 cents a gallon in 200-gallon lots in spite of promises for a small rise.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb.....	.07½	.07½	.07½	.07½	.07½	.07½	.....
Beams & Channels, 100 lbs.....	....	....	....	....	....	....	.....
Bessemer Steel, Pittsburgh, ton.	22.50	22.50	22.50	22.50	22.50	22.50	.....
Copper, Elec., lb.	.17⅜	.17⅜	.17⅜	.17⅜	.17⅜	.17⅜	.....
Copper, Lake, lb..	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.17⅝	.....
Cottonseed Oil, August, bbl....	6.59	6.44	6.45	6.50	6.45	6.32	— .27
Cyanide Potash, lb.....	.19	.19	.19	.19	.19	.19	.....
Fish Oil (Menhaden)	.33	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals. @....	.21	.21	.21	.21	.21	.21	.....
Lard Oil, prime..	.85	.85	.85	.85	.85	.85	.....
Lead, 100 lbs....	4.55	4.55	4.55	4.50	4.55	4.70	+ .15
Linseed Oil.....	.68	.68	.68	.68	.68	.68	.....
Open-Hearth Steel, ton.....	23.00	23.00	23.00	23.00	23.00	23.00	.....
Petroleum, bbl., Kansas Crude..	.70	.70	.70	.70	.70	.70	.....
Petroleum, bbl., Pa. Crude....	1.60	1.60	1.60	1.60	1.60	1.60	.....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	.....
Rubber, Fine Up-river Para..	1.22	1.22	1.22	1.22	1.22	1.21	— .01
Silk, raw Ital....	....	4.15	....	....	4.15	....	.....
Silk, raw Japan..	....	3.72½	....	....	3.77½	....	+ .05
Sulphuric Acid, 60 Beaumé.....	.99	.99	.99	.99	.99	.99	.....
Tin, 100 lbs.....	46.10	46.00	46.00	46.00	46.25	46.25	+ .15
Tire Scrap.....	.09	.09	.09	.09	.09	.09	.....

Aristos-Disco Suit Filed

Eastern Distributors for the Gas Starter Company Demand $325,000 Damages —Seven Causes of Action

Breach of Contract Alleged in Action Brought in Federal District Court at Detroit

WORD was received in New York Tuesday by E. B. McDuffee, president of the Aristos Company of New York, that suit has been filed in the United States District Court for the Eastern District of Michigan on behalf of the Aristos Company demanding damages of $325,000 from the Ignition Starter Company, alleging breach of contract.

According to a copy of the bill of complaint the suit is based upon seven causes of action. The bill alleges that the Aristos company has been the Eastern distributor for the Disco starter. That as such it purchased upwards of 4,000 starters for more than $50,000 and it complains that the contract conditions under which the starters were purchased were violated by the defendant company in numerous particulars for which damages of $100,000 is demanded. For violation of an alleged agreement not to advertise the Disco in the Eastern section of the country except with reference to the Aristos Company as Eastern distributors, $10,000. Lack of service, $75,000. Various elements of damage and loss caused by the alleged actions of the defendant company, $94,000, and for other reasons, $21,000.

The suit is a law action and the usual course of such proceedings is to reach an issue on the pleadings within 6 months and a hearing soon thereafter.

DETROIT, MICH., Aug. 28—Suit has been entered in the United States District Court by the Aristos Company, a Delaware corporation, against the Ignition Starter Company, makers of the Disco starter, asking $325,000 damages for breach of contract.

Esterline Company Forming Plans

INDIANAPOLIS, IND., Aug. 26—Announcement was made a few days ago of the purchase of one-half of the capital stock of the Esterline company, LaFayette, Ind., by Carl Fisher and J. G. Allison, owners of the Prest-O-Lite Company and the Indianapolis Motor Speedway. The capital stock of the company is $250,000. The plant at present located at LaFayette, will be moved to Indianapolis, and will locate at Speedway.

The Esterline company, it is announced, has already booked orders for the Berdon electric lighting equipment aggregating more than $1,000,000.

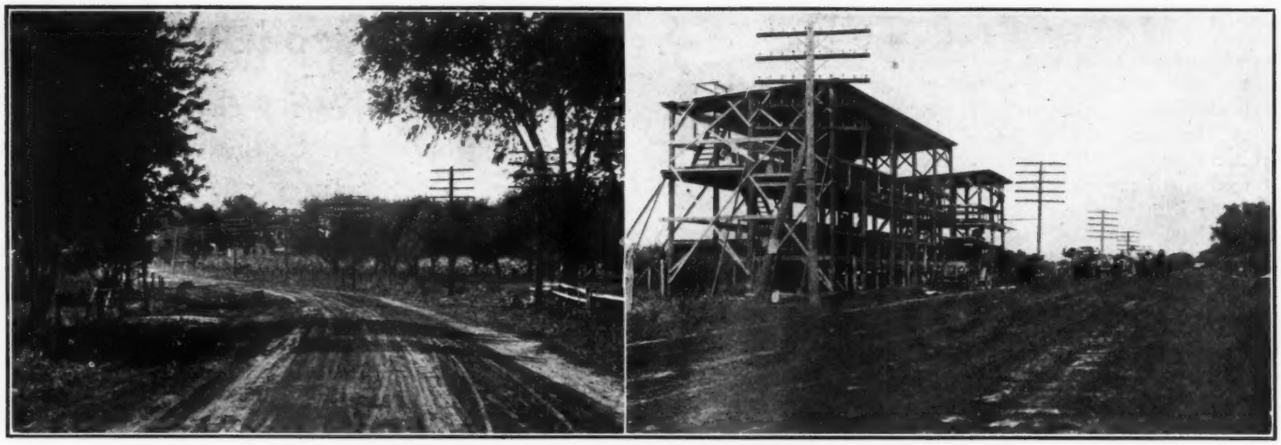
One of the most important lines to be manufactured is a new electric lamp for motor vehicles.

Swinehart to Issue Stock

AKRON, O., Aug. 28—Stockholders in the Swinehart Tire & Rubber Company have been offered a right to subscribe for 23 per cent. of their holdings in the new stock issue recently authorized by the company at par. The business of the company has outgrown its working capital and the increase in the issue of stock is to provide such. The subscription is subject to ratification at the annual meeting September 25.

Vinot Factory for Montreal

MONTREAL, Aug. 26—The Montreal Automobile Carriage Company has been formed for the purpose of building all sorts of cars. The Vinot Car Company, of Canada, has contracted for all the Vinot cars to be built by the Automobile Carriage Company and skilled mechanics are coming from the French factories.



View of the press stand now under construction alongside Elgin course. North stretch of the course undergoing repairs

Elgin Has 34 Entries

Great Road Races Promise to Surpass Record for Course—Many Celebrities Listed Among the Drivers

Well Balanced Fields Named to Go in Each of the Contests Scheduled for This Week

CHICAGO, Aug. 27—Meeting with far greater success than even its most enthusiastic supporters anticipated, the Chicago Automobile Club stands ready to run the third annual Elgin road races next Friday and Saturday and offers a program that is of greater brilliancy than anything of this kind ever developed in the Middle West. Whereas a couple of weeks back it looked as if the club would be lucky if it brought together twenty entries, today when the final count was made and the drawing for numbers took place, it developed that there were thirty-four entries on the books, not counting the four Peugeots which had been declared following the receipt of a telegram from Importer Lacroix to the effect that the French cars had been shipped for an American engagement. It now looks as if this was a false alarm, at least so far as Elgin is concerned. While the Peugeots remain on the list they will be booked only in case they get here in time to race.

The thirty-four entries in hand represent a larger field than started last year when stock car racing held the center of the stage. The thirty-four are divided so that three will start in the small car race for which F. W. Jencks, general manager of the Elgin Automobile Road Racing Association, is offering the trophy; six are booked for competition in the race for the Aurora trophy for cars of from 231-300 inches; while four are to start for the Illinois cup for 301-450 cars. This makes thirteen cars for the first day and inasmuch as all three races are run simultaneously it will make a big field. On the second day there will be fifteen cars running, twelve in the Elgin National Watch company trophy race for cars 600 inches and under and nine in the free-for-all. There are three of the free-for-all cars that are not in the Elgin.

Twelve different makes of cars are represented in the 2 days of racing, out of which number three—still not counting the four Peugeots—are of foreign extraction, the Fiat, of Italy, and Benz and Mercedes, of Germany. American makes represented include the Knox, Stutz, Mercer, National, Rayfield, Mason, Falcar, Ford and Herreshoff. This will be the first appearance in the racing field of the Rayfield, a six-cylinder car made in Springfield, Ill. New also is the Mason which is entered in the Aurora cup and the Elgin trophy races. This Mason is a slightly larger one than the Mason which Harry Endicott drove so successfully at the Galveston beach meet.

A list of drivers includes nearly all of the celebrities, those booked being Teddy Tetzlaff, Ralph Mulford, David Bruce-Brown, Ralph DePalma, Erwin Bergdoll, Spencer Wishart, Hughie Hughes, and Caleb Bragg. In the case of Bruce-Brown there still remains some doubt, for while the American Grand Prix winner was the first entrant, his plans have been somewhat upset by the non-arrival of his Fiat car from Italy. He is expected here not later than Wednesday, when an attempt will be made to have him drive one of the Fiats which Teddy Tetzlaff brought here from Los Angeles. Caleb Bragg has been nominated by E. C. Patterson, of Chicago, the sportsman who endeavored to import the French Peugeots. Failing to get a definite reply from the Frenchmen, Patterson, on Saturday, nominated Bragg, but as yet he does not know whether Bragg will drive a Fiat or a Belgium Metallurgique which he is reported to be preparing for Milwaukee.

With such a choice collection of cars and drivers, the Chicago Automobile Club has the stage all set for the big show. The course is in good shape and well oiled, soldiers have been secured to guard the course, a great interest aroused among the motorists of the Middle West and a prize list which includes $6,500 in cash has been offered. Threfore, the local promoters who have had only 7 weeks in which to handle the meet, feel confident that success awaits there efforts Friday and Saturday. The entry list is given on page 42.

Georgia Town Runs Trade Tour

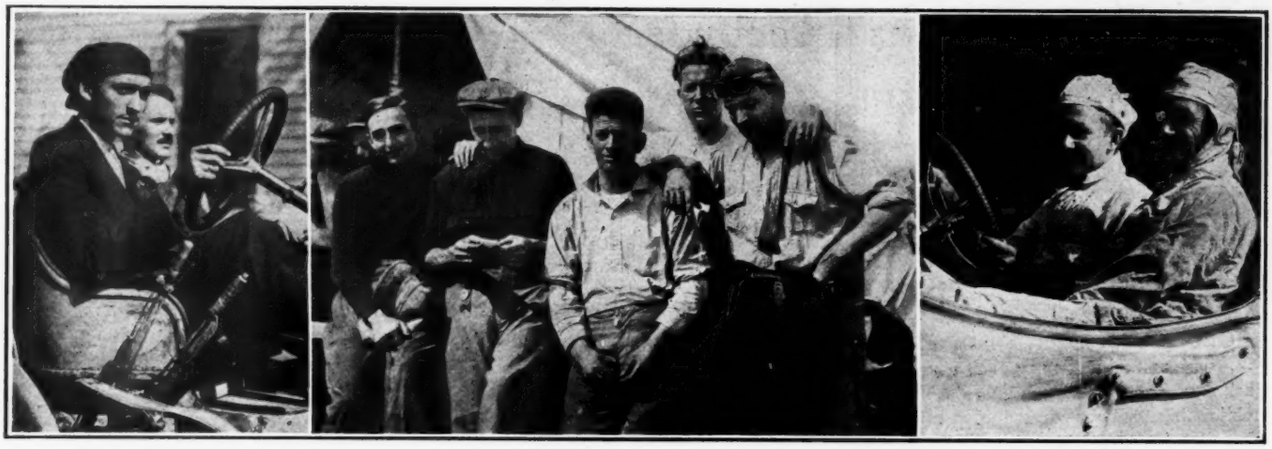
ATLANTA, GA., Aug. 26—The possibilities of the automobile as a trade builder for the merchants of towns and small cities has been demonstrated by the little town of LaGrange, Ga. This city held the first of two boosting tours recently, covering three counties north of it. It will soon hold a second traveling southward.

The first trip covered 70 miles and more than forty business men of the little town made the circuit. Good crowds were present at all their stops. No attempt was made to do any business, but LaGrange was boosted as a trading point.

Other Georgia towns are planning to duplicate this experiment.

Club to Climb at Davenport

MOLINE, ILL., Aug. 26—The Davenport Automobile Club, which includes in its membership Moline and Rock Island automobilists, will hold a hill climb at Moline on Labor Day. Eight events have been carded, including a free-for-all for amateur drivers, the cars entered to carry full factory equipment. For this event the Josephson silver cup will be the first prize. Entries are



Left, Bergdoll in his big Benz. Center, left to right, Drivers Pullen, Hughes, Endicott and Tetzlaff, with Mechanician Hill in background. Right, Mulford in his Knox Six

limited strictly to members of the Davenport Automobile Club.

The events are for cars costing $1,000 and under; cars costing $1,000 to $1,800; cars costing $1,800 and up; cars costing $2,000 and under, carrying four passengers; cars costing $2,000 and over, carrying four passengers; age handicap; free-for-all; free-for-all for Josephson cup, amateur drivers, cars must carry full factory equipment.

Milwaukee Club Holds Evening Tour

MILWAUKEE, WIS., Aug. 25—The Milwaukee Automobile Club conducted its first annual Harvest Moon tour on Saturday evening, August 24, from its clubhouse at Milwaukee to Oconomowoc, the famous summer resort, and return. Sixty-seven cars participated. The start was at 5 o'clock and dinner was taken at Lalumier hotel on Oconomowoc lake at 7 o'clock. The return trip was begun at 8.30 o'clock, and the route was via Waukesha, where a party of twenty cars from the Waukesha Motor Club was picked up and taken to the Milwaukee clubhouse for a buffet luncheon and informal dance.

M. C. A. Revises Contest Rules

DETROIT, MICH., Aug. 24—Recommended changes in the rules to govern automobile contests for the coming year were formulated and presented to the General Rules Committee of the Manufacturers' Contest Association at its mid-summer meeting held recently. The proposed changes are few in number and not radical, but the exact significance of them cannot be established until the tentative list is acted upon by the Contest Board of the American Automobile Association.

A general poll of the situation was taken in advance of the meeting and queries as to changes in the code were presented to 130 manufacturers in and out of the organization. Sentiment was about evenly divided between the advisability of holding strict stock contests and non-stock contests.

CARS AND DRIVERS ENTERED IN THE ELGIN RACES, SHOWING THE BORE AND STROKE OF THE ENGINES

Jencks Trophy: Friday, August 30, 11 a. m., 96 miles, or 12 laps

No.	Car	Entrant	Driver	Bore	Stroke
41	Mason Special	F. S. Duesenberg	H. Endicott	3 13/16	5
42	Ford, 1911 T	Moe Brothers	F. W. Moe	3¾	4
43	Herreshoff, 20, 1909	Herreshoff Motor Company	W. G. Wordingham	3⅜	3 5/16

Aurora Trophy: 152.5 miles, or 18 laps

31	Mercer, 35-C	Mercer Auto Company	E. Pullen	4⅜	5
32	Falcar Special, 1912	Fal Auto Co	Hastings	4⅛	5¼
33	Falcar Special	Fal Auto Co	Wilbur	4⅛	5¼
34	Mason Special	F. S. Duesenberg	Roberts	3⅞	5
35	Mercer, 35 T	Mercer Auto Company	Wishart	4⅜	5¼
36	Mercer 35 T	Mercer Auto Company	Hughes	4⅜	5

Illinois Trophy: 203 miles, or 24 laps

21	Stutz, 1912	Stutz Motor Car Company	Anderson	4¾	5½
22	Rayfield Six, 1913	Rayfield Motor Company	Hobbs	4	5½
23	National 40, 1911	Fred Cummiskey	Whalen	5	5 11/16
24	Stutz, 1912	Ideal Motor Car Company	Merz	4¾	5½

Elgin National Trophy: Saturday, August 31, 11 a. m., 254 miles, or 30 laps

1	Knox Six	Ralph Mulford	Mulford	4¾	5½
2	Mercedes	W. H. Bertrand	Clark	5⅛	7⅛
3	Mason Special	F. S. Duesenberg	Roberts	3⅞	5
4	Mercedes	E. J. Schroeder	De Palma	5.2	7.06
5	Fiat Seventy	E. E. Hewlett	Tetzlaff	5¼	7½
6	Falcar Special	Fal Auto Company	———	4⅛	5¼
7	Stutz, 1912	Stutz Motor Car Company	Anderson	4¾	5½
10	Falcar Special	Fal Motor Company	———	4⅛	5¼
11	National 40, 1911	Fred Cummiskey	Whalen	5	5 11/16
12	Stutz, 1912	Ideal Motor Car Company	Merz	4¾	5½
14	Mercer 35 C	Mercer Auto Company	Wishart	4.39	5
15	Mercer 35 T	Mercer Auto Company	Hughes	4⅜	5

Free-for-all, 306 miles, or 36 laps

1	Knox Six	Ralph Mulford	Mulford	4¾	5½
2	Mercedes	W. H. Bertrand	Clark	5⅛	7⅛
4	Mercedes	E. J. Schroeder	De Palma	5.2	7.06
5	Fiat 70	E. E. Hewlett	Tetzlaff	5	7½
8	Benz, 1911, Racer	Bergdoll	Bergdoll	6.2	6.3
9		E. C. Patterson	Bragg		
11	National 40	Fred Cummiskey	Whalen	5	5 11/16
15	Mercer 35 T	Mercer Auto Company	Hughes	4.39	5
16	Fiat	Bruce-Brown	Bruce-Brown		

Wishart Breaks Records

Lowers Mark for 200 Miles and Several Intermediate Distances on Columbus 1-Mile Circular Dirt Track

Official Rules Covering Next Year's Grand Prize Race Published by the Automobile Club of France

COLUMBUS, O., Aug. 26—Records were shattered at the second annual 200-mile race given at the Columbus Driving Park August 25, under the auspices of the Columbus, Ohio, Automobile Club. The records for 75 miles, 100 miles, 150 miles and 200 miles on a circular dirt track were broken before a crowd estimated at about 35,000. The race was successful in every way and there were no accidents of any kind to mar the pleasure of the afternoon.

Spencer Wishart, in a Mercer, finished first in 3 hours, 28 minutes and 4 1-2 seconds, as against a previous record on the same kind of track of 3 hours and 45 minutes. The others finishing inside the money were Howard Wilcox, in a Cino, time 3:35:10; Johnny Jenkins in a Cino, time, 3:35:30 and Neil Whalen, in a National, time, 3:36:49. Ben Lawwell, in a Westcott, was also in at the finish but was not in the money.

Wishart drove steadily throughout and did not push his engine for the first 50 miles. After some jockeying, Wishart took the lead and held it with the exception of a few laps around the 50-mile period. At 65 miles, the Mercer led and was never retired from that position. It was after negotiating 103 miles that Wishart came into the pit for the first time and then three tires were changed. At that time he was four laps to the good and left the pit still in first place. At 129 miles Wishart again went to the pit for tires and water and at 180 miles the third stop was made, this time for oil. All told, he lost 10 1-2 minutes in the three stops.

The records broken were: 75 miles by Wishart, in his Mercer, 1 hour, 19 minutes and 38 seconds as against the record of Strang, at Columbus, O, July 3, 1909, in 1 hour 19 minutes and 39 seconds. 100 miles by Wishart, in his Mercer in 1 hour 40 minutes and 51 seconds as against Burman, at the Columbus, O., track, July 3, 1909, in 1:41:00 2-5. He made the 150 miles in 2:34:05, which won for him the Virginia Hotel cup.

The money and prizes distributed were: Wishart, in Mercer, $1,000 and Chamber of Commerce trophy. Wilcox, in Cino, $500 and Hartman Hotel trophy. Jenkins, in Cino, $300 and North Side Chamber of Commerce trophy. Whalen, in National, $200 and Williams & Schlereth trophy; 50-mile lead, Cino, Jenkins, Gordon Trophy, time, 1:02:41; 100-mile lead, Mercer, Wishart, Central Ohio Oil Company cup, time, 1:40:51; 150-mile lead, Mercer, Wishart, Hotel Virginia cup, time, 2:34:05. A summary of the prize winners and their respective times follows:

Car	Driver	Time
Mercer	Wishart	3:28:4½
Cino	Wilcox	3:35
Cino	Jenkins	3:35:30
National	Whalen	3:36:49

French Race Rules Published

PARIS, Aug. 16—In its official rules just published for next year's Grand Prix race, the Automobile Club of France has determined an allowance of 20 liters of gasoline per 100 kilometers (being at the rate of 14.1 miles to the gallon) and fixed a minimum weight limit of 1,763 pounds and a maximum of 2,425 pounds, without gasoline, oil, water, tools or spares. The total distance of the race, which will be a 1-day event, will be about 560 miles, the course to be about 30 miles round and as near as possible to the city of Paris.

Minute precautions have been taken in the drawing up of the rules to provide against cheating. In addition to a fine of $2,000 and disqualification of the driver, his team mates and the firm proved guilty of an attempt to dodge the rules, the committee has decided that it will supply the gasoline tank, the piping and all unions. The tank, which will be 39 inches in length and of a diameter to be determined when the total distance of the race has been decided on, must be placed across the frame to the rear of the two seats, it must not be encased or covered in any way, and the car must carry all spare tires and wheels across the frame to the rear of the tank. The whole of the fuel to be used in the race will be put into the tank before the start; thus if the distance is 560 miles, the amount of gasoline aboard will be about 40 gallons. The gasoline allowance will be made at a temperature of 15 degs. C., with rectification for any variation in temperature from this standard.

When the tanks have been filled on the day before the race, the filler cap will be sealed, all connections on the gas line will be sealed, and a control put on the carbureter, the car then being placed under military guard until the moment of the race.

Permission is given the competitors to indicate the brand of gasoline they desire to use in the race, a list of ten different makes being quoted from which a choice can be made. The particular brand selected will be bought from the retailers in the ordinary sealed cans and only opened in the presence of the competitors.

The construction of the tanks will be such that it will be impossible to put gasoline in without detection.

Under the rules any manufacturer can enter six cars at a fee of $800 per car, entries to be received by October 31 and to attain a minimum of forty for the race to be held. In view of the possibility of too large a number of starters, the right is retained to reduce the number per firm, starting with the firms having the maximum number of cars entered, by the drawing of lots, or by the running of an elimination race, as may be considered advisable. From October 31 to March 1, 1913, entries will be received at double fees.

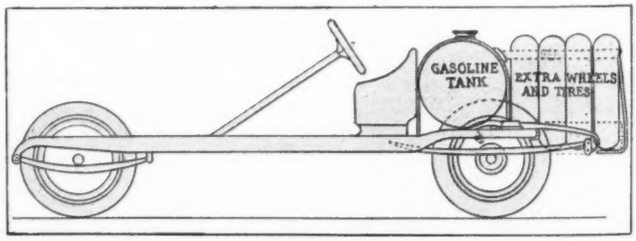
Alco Truck in Home Stretch

KELTON, UTAH, Aug. 26—The Transcontinental Alco truck has reached here, with a distance traveled of 3,150 miles and a record of thirteen state lines crossed. Less than 800 miles now remain of the journey from the factory of Charles W. Young & Company, Philadelphia, to the Carlson-Currier Company at Petaluma, Cal.

In contrast to the floods, washouts and other obstacles to travel that were met in Wyoming good road conditions have been experienced by the truck in Utah.

In reaching Kelton, the crew, on account of superior conditions for traveling, chose to make a wide detour to the north and drove across the Utah-Idaho state line just above Snowville.

MINNEAPOLIS, MINN., Aug. 27—The Contest Board of the Minnesota State Automobile Association announced today the disqualification of Studebaker No. 3, a contestant in the runabout class for the *Daily News* Cup in the recently run fourth annual reliability tour which finished at Winnipeg. The cause of the disqualification was that the car left the course, running around Foxholm, Minn., on the fourth day of the contest.



Position of fuel tank and spare wheels and tires prescribed by rules for 1913 French Grand Prix

Painting and Upholstering

High Grade of Workmanship Exacted By Automobile Owners and Users Elevates These Trades to Arts

Not Only Must General Effect Be Pleasing But Detail Must Be Carefully Executed Throughout

OF ALL the trades connected with the making of the automobile, none is more important and essential than those of painting and upholstering. Other trades are mechanical; these are charged with the elements of art.

The motor maker, the body fashioner, the designer, the worker in wood or metal, and the cunning artificers in various other lines create the car to do its appointed work, but without the creative, artistic and executive talent of the painter and upholsterer the prospective buyer would be as a stranger unto the salesman's inexhaustible vocabulary.

Neither the painter nor the upholsterer is a mechanical necessity. Both contribute to the comfort of the car owner; one to both the physical and mental, the other to the mental. Both, to accomplish the higher order of results now exacted by automobile owners and users, must be experienced and expert in all the intricacies of their crafts.

With the upholsterer, design, style, finish, material, color, form and finish, together with the luxurious effects which all these things are expected by the car owner to give to the vehicle, are chief items of his stock in trade. Not only must the general effect be all that anything in art can well be, but in detail also the work must, to meet modern requirements, be complete throughout.

Car Buyers Growing Critical

Within the past 2 years, car buyers have found it to their interest to be critically exacting in their choice of upholstering for their cars. Good upholstering or trimming serves no useful purpose, aside from a mere temporary effect, unless it is durable.

Durability of the upholstering depends perhaps about equally upon the workmanship and upon the quality of the goods used. The cushion and back springs, and the materials immediately connected with these in bringing up the form and foundation for the finer fabrics, are essentially important and the car owner may rightly insist upon these being of the best. Like the painter, the upholsterer or trimmer is concerned with the foundation building. With a defective under-structure the whole building, however fitly joined together upon its outer trappings, is in ever-present danger of going to pieces.

The maintenance of form, expansion, compression, with here a little and there a little of that deftness of touch which is at once the unmistakable mark of a superior workmanship, are necessary factors in the make-up of a good and durable job of car trimming.

Some of the foundation materials may be summarized as follows: Springs, sheeting, webbing, duck, buckram, thread, hair, etc.

For high-class work, which, after all, is ultimately the cheapest, the best curled hair, with sheet cover padding and springs of the finest elasticity, worked into an adjustment that means the most satisfying comfort, are indispensible.

With the outer adornments of the upholstery—the cloth, and silks, and satins, and lace, and cord, and leather, tufts, buttons, tassels, carpets—everybody having to do with the car is concerned. These things, of course, are variously priced, according to quality, but, as before stated, quality rather than the price should be the governing factor. Generally speaking, in the choice of cloth the car owner or buyer should select as the fabric most durable, goods of moderately long wool, soft and firm to the touch, not too compactly woven, clear in thread, and warp and woof, of cheap and shoddy filling, pliable, elastic and suggestive of luxury.

For automobiles of the best class, hand-woven laces continue to be in favor despite the expense attached to their use. Cushion fronts, doors and pillars display the wide laces, while the narrow fabrics are used, as required, principally in connection with the wide samples. In automobile upholstering, as in the painting, very much depends upon the choice of colors—their capacity to undergo service without fading. Naturally in the finest fabrics the color is fast and uniform.

For automobile work, the cloth should be dull finished—that is, without gloss. This is produced under the process of cold pressing, whereas hot pressing produces the gloss finish. Either finish may be made up from the same piece of goods.

The dyeing of the cloth has much to do, we are told by those in authority, with the quality, supposing the quality of the fabrics to be uniformly good previous to this treatment. There are at least two processes of dyeing, namely: Wool dye, which provides for the wool being dyed prior to being woven, and piece dye, which provides for dyeing the cloth in the piece as it comes from the loom.

In leathers, choice colors may be had for automobile work. Many rare and beautiful colors are wrought in leather, the split-hide leather, it is said, taken from the best hides, being most largely used for car upholstering. The finish, feel and appearance of fine leather, colored to harmonize and soften down the entire tone of the interior work, confers upon the upholstering a sense of comfort, of luxury, of indescribable restfulness quite unsurpassed by anything else that art or the ingenuity of man can put into the car.

Besides the cover fabrics, the cloth or leather, there are the interior furnishings, which belong to and are a part of the trimming of the car. You may choose to call them accessories, but they practically all belong to the trimmers' department of work for arrangement and display.

For the larger type of car, limousines, etc., there are hat-racks, parcel-nets, dome lights, corner lights, megaphones, coat-hooks, bouquet- and umbrella-holders, and a fairly wonderful list of other sundries which must enter into the completion of the car if it is to approach in detail work, and in the hundred and one little things making for the delight and convenience of the user, the beautifully finished and furnished cars from over the sea.

So, too, in the painting. While the American finisher gives to the car a quality of work unsurpassed, the American painter in his choice and combination of colors, and his manner of displaying them, fails somewhat by comparison with the work of the incomparable French colorists. However, we are this year being treated to a quality of color work which promises very soon to equal, or even surpass, anything accomplished by foreign touch artists.

Surface Work Highly Perfected

Surface work, rounding out and perfecting every detail of the under foundation is a department of work which in this country has been brought to a high state of perfection. If the French painter leads his American brother in color methods, the latter leads the world in surface creations and in the fine art of finishing.

While all these things are of immediate concern to the car owner the durability of the colors, the wearing properties of the varnish, and the results wrought out by a combination of the two are of still greater importance. The dark, fine blues and greens and maroons which seemingly harmonize with practically every popular upholstering and trimming material are, for the most part, durable colors requiring only the adequate protection of plenty of good varnish to maintain them in a high order of excellence through a long term of service.

How a newly-planted rubber orchard in Ceylon is laid out—Here the trees are only 12 feet apart, a mooted subject among the experts

Plantation Rubber a Factor in Industry

Production Increasing Rapidly, Thus Counteracting the Demand on Para Grades—Some Interesting Details Outlined by Experts with Regard to Advanced Methods in Use Among the Planters of Ceylon and the Far East

PLANTATION rubber in 1912 will reach a production 100 per cent. in excess of the production of cultivated rubber in 1911, according to the estimates of experts engaged in that branch of the industry and verified by the rubber auction reports from London and the other great marts where plantation rubber is handled. The amount of plantations offered in London is gaining with each fortnightly auction as compared with the offerings of last year.

As applied to the automobile industry, the production of plantation rubber is of prime importance and also has a secondary bearing that is an immense influence. There is a closely guarded question as to whether tire makers use any considerable amount of plantations in the manufacture of their wares. Some of them deny it; others will not make a definite statement with regard to the matter, while still others tacitly admit that plantation rubber has sufficient quality for their purposes without saying that their companies use it.

The general claim is made by tire makers that pure, hard-cure, up-river Para is used exclusively for tire making in their particular establishments. In proof of their claims it may be stated that the tire makers do buy and use vast quantities of Para and considerable supplies of that grade and variety of rubber may be seen in their storage warehouses in its original form.

To Equal Para in Quantity in 1915

But, whether or not plantation rubber is used to any material extent in tire making, the fact remains that every ton of merchantable plantation rubber manufactured and marketed has a distinct bearing upon the tire industry, inasmuch as it relieves the pressure of demand from the Para grades, because even if plantation rubber is not utilized for tires, it is usable for many other purposes that have always required Para in the past, and will be used for many other purposes in the future that would have accentuated the demand for Para when they became developed.

In the first 7 months of 1912 10,000 tons of plantations were auctioned in London, which is the principal trade point for that class of merchandise. In the corresponding period of 1911 the total was a round 6,000 tons. As the shipments are becoming larger each month, the rate of increase over last year steadily rising, makes it more than probable that the number of tons marketed in London will be at least double those of 1911. The total amount for the year is estimated in that market at approximately 20,000 tons.

Increase of 100 Per Cent. Expected

Next year with the new plantations coming into commercial productivity and with the increased production of the present plantations, a total yield of over 40,000 tons is predicted. As to figures further in the future, at best they are estimates, but the opinion of the experts is that the yield will increase to the total capacity of the available labor to handle.

It has been predicted that by 1915 the total yield of plantations will more than equal that of the Para districts and the rest depends upon the quality and quantity of available labor and the introduction of advanced economic methods in cultivating, collecting and manufacturing.

The plantation rubber industry is about 36 years old, having been born shortly after H. A. Wickham, a British scientist of high rank, had smuggled a boatload of seed of the Hevea Brasiliensis out of the Amazon country. The removal of Hevea seed proved a surprise to the Brazilian government. In fact, it was not within the legal contemplation of that state that such a situation should eventuate.

The cargo of seeds numbered many thousands, but after the delays that attended their transportation by devious routes to

Ceylon, only a few hundred of them were sufficiently preserved to germinate. There were some live germs in the seeds, however, and the result of Mr. Wickham's enterprise proved to be a nice little patch of infant rubber trees, numbering about 100 trees all told.

From that start the great plantation rubber industry of Ceylon, Malaysia, Oceania and the East Indies generally has developed. The initial plantation was so small that it required many years before it was possible to plant large areas on a commercial scale and still longer to bring the plantations to a point where the yield of rubber was large enough to be called a factor in the industry as a whole.

That day has now dawned and from this year plantation rubber must be reckoned as one of the chief elements in the industry.

The history of its development marks a tremendous step in the automobile industry. Ten years ago there was only a small fraction of the total production of rubber that was used by the automobile tire makers. Today it represents thousands of tons, more than half of the Para yield, and yet the price of crude rubber is not equivalently higher when the augmented demand is considered.

All the Ceylon plantations are from seedling Hevea Brasiliensis, which originated from the Wickham seed. Generally speaking, the yield per tree, 8 years old and 18 inches in circumference 3 feet above the ground and ranging from that size and age upward to the largest trees now in bearing, may be reckoned at about 6 pounds per season. The new plantations and those that have not had the most advanced type of care and administration will average less than that rate of yield and the older and better cared for plantations will yield more than that rate. Mr. Wickham takes the position that the trees should be planted not less than 33 feet apart and run not more than fifty trees to the acre. Kelway Bamber and other experts figure that 150 trees per acre is not excessive, and a few of the extremists on the other side place their figures as high as 500 or more.

According to Mr. Wickham's contention the trees require a large area of ground so that their roots may spread out in all directions, giving the tree a strong support and by reason of the lack of crowding below the surface to avoid the chance of having the tree become debilitated and liable to fungus infection on account of its lack of strength. He also demonstrated that tree for tree plantations conducted along the lines he indicated yielded a much larger amount of latex than those where close planting was the rule.

Wickham Points Out Essentials

Mr. Wickham divides the plantation rubber problem into three heads and places these heads as follows:

First.—That the Hevea tree has, and is still, being altogether too closely planted for a tree—a forest tree—of its natural order and habit.

Second.—The system designated generally as clean-weeding considers land from which the humus of the surface being burnt off, what remains of the surface soil is exposed to the bake of the sun and the beat of the rain and may be seen any day being carried bodily away in the drains of the nearest watercourse—a loss never to be replaced.

Third.—Incision versus excision in the manner of tapping the trees for latex.

Under the first head he argues that the powers of growth must be arrested if insufficient room for the roots is allowed. He claims that the whole idea of the plantation is based upon some plan for avoiding that very difficulty by making adequate space provision for the rubber trees.

Under natural conditions in the jungle there is always a tense struggle for existence between the jungle and forest growths. This is somewhat compensated because the various elements in the competition are of different botanical orders and draw upon different food constituents. Much material also is returned to the ground in the form of humus for future food supply. But in the case of the plantation, the trees, all of one species, demand the same food elements and a fierce competition is concentrated on soil that is often denuded of humus. In tropical soil germs of morbid or fungoid growth are always present. These are usually innocuous unless the tree's power of resistance has been lowered. There is nothing that will lower the power of a tree or a man like starvation and make it or him liable to the germ of disease. If, however, the vitality of the subject be kept on a high plane by food and care, the chances for deterioration are minimized.

On the subject of clean-weeding Mr. Wickham says that if the surface is burned off and the soil washed away or baked around the roots, the tree must suffer at once. The Hevea loves to have its head in the sunlight and its roots in a cool, free, covered soil. Quoting from Dr. Ewart Mr. Wickham said:

"The use of fire to clear ground in preparation for cultivation is common among primitive races who practice a more or less rudimentary kind of agriculture, but with the advances of science fire plays less and less part in its doings. Even in a garden the less the amount of rubbish that is burned instead of being rotted in, the less amount of manure is needed to be carted in to keep up fertility. Eactly the same thing applies on a larger scale and even greater extent to agriculture."

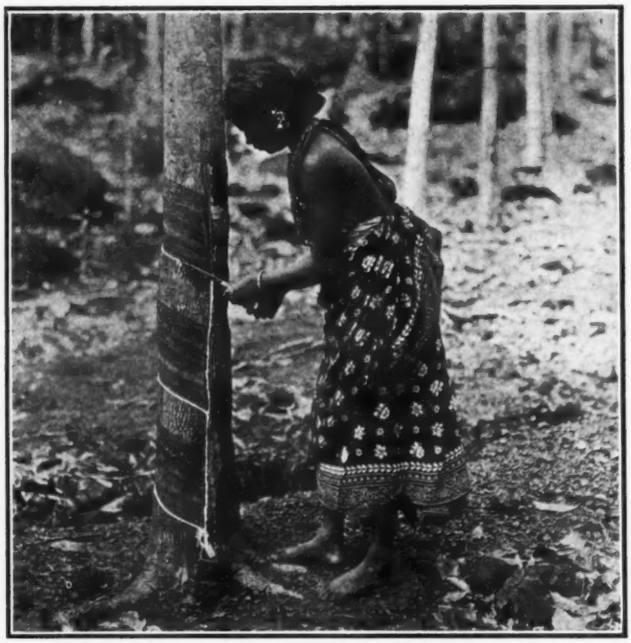
Favors Incision Method of Tapping

With regard to the question of incision versus excision, Mr. Wickham holds that the former system will eventually be found to be the better method of tapping.

Kelway Bamber agreed with much that Mr. Wickham had presented. He stated that his experience in Ceylon pointed to 150 trees to the acre as being not too many, particularly in the early period of the plantation. He cites the fact that the rapid growth of the trees placed in such close proximity to one another gives rapid and adequate protection to the surface soil, shielding the earth from the rays of the sun and the force of the rain. Undoubtedly the wider planting, such as contemplates from forty to forty-eight trees to the acre, will give trees in time that will prove larger and more productive than those planted close together, but, he maintains that the plan of planting 150 trees or thereabouts has given better financial results than the other system so far in the industry.

Oldest rubber plantation in the world, which was started 36 years ago

Fish-bone method of tapping, showing feeder channels



Fish-bone method, showing vertical cutting and feeders

Speaking broadly of the plantation situation, Mr. Bamber said:

"Luckily for Ceylon the proportion of poor yielding trees is slight, but when found all such trees should be removed to prevent crossing with the better varieties. For the first 2 or 3 years, especially in soil requiring much drainage, the greater proportion of Hevea trees show a distinct gray bark, which darkens and becomes more corky from the base upwards after that period. After the third year the bark of the better types of trees increases in thickness considerably. When rubber first began to be planted on a large scale it was usually estimated that no returns would be obtained under 5 or 6 years, but it has been found in many instances that the trees were of sufficient girth to commence tapping in or after the fourth year and that with careful work no harm to the tree resulted, but should the trees at this early stage be over-tapped serious harm might follow.

"A favorite system, first tried on the Lanadron Estate, was to commence with a basal V tapping, embracing half the circumference of the tree and 15 inches from the ground and with another V, 12 to 15 inches above it, if the girth of the tree permitted. This is now frequently employed, with various modifications as to the proportion of the bark tapped, and while in many cases it gives satisfactory yields, it affords a means of gradually training the coolies to do good work before the bulk of the trees come into bearing.

Spiral Bleeding System Passing Away

"The spiral form of tapping has now almost gone out of practice, especially since Professor Fitting's able brochure was published. Latterly also the old system of pricking and paring is disappearing, as it has been found that better yields are obtained by paring only and with less injury to the trees. The evidence is, however, not conclusive and some of the finest work has been done by the combined tools followed by excellent healing of the bark.

"Professor Fitting demonstrated by his experiments that the supply of plant food for the stem, etc., was interfered with to a large extent by the spiral or half-spiral and similar methods of tapping and recommended that opposite quarters only should be tapped to minimize this effect, a suggestion that is being freely adopted."

Going into the details of advanced tapping methods, Mr. Bamber takes the position that with young trees it is better to tap only one-third of the circumference at a time. He states that if opposite quarters are used, the length of the cuts will not be sufficient to insure a good flow of latex. He cautions extreme care in tapping so that the bark of a certain section will last the required number of months. Twenty cuts to the inch is considered as a fair average. If one-third of the bark is tapped during the first year on an 18-inch tree, at 3 feet from the ground, at the end of the year the tree should measure from 23 to 24 inches in girth. The process of tapping is believed to be a fostering influence to promote the girth of the tree.

Tapping Increases Girth of Trees

When a tree has reached a girth of from 23 to 24 inches it is considered large enough to be subjected to tapping on opposite quarters if desired.

In tapping by the paring methods only, it must be remembered that the bulk of the latex tubes are situated close to the soft formative substance from which the growth of the tree is supplied, called cambium. Thus the blade of the tapping tool must go fairly deep if the latex is to be extracted. The slightest fraction too little in the incision will result in disproportionately small annual yields.

Formerly it was considered that no renewed bark should be touched under 4 years, but now it has been found that a good flow can be obtained after the second year from the bark that had been tapped previously. If the bark is not renewed within 2 years it may be taken as proof of the fact that tapping has been too rapid for the vigorous growth of the tree.

The new incision method of tapping is described by Mr. Bamber as follows: "It consists of cutting shallow vertical channels down the bark from 6 feet to the ground, incising these at 1 inch intervals. The latex is collected at the base of the tree in the usual way. Two channels are cut the first day on opposite sides of the tree and incised with a special blade from top to bottom at intervals of an inch. The second day after two more channels are cut 3-4 inch to the right of the two already made, and similar incisions are made as in the course of the others. On alternate days this process is continued until the whole circumference of the tree has been channeled and incised at 3-4-inch intervals. The tree is then rested for 6 weeks

and the incision and channeling process is repeated on alternate days in the same channels but with the incisions 1-4 inch below the previous cuts. After each complete round the tree is rested for 6 weeks so that the trees are tapped an average of 72 days in a year, in six periods of 12 days each.

The yield from this process is about on a par with other systems, but it is open to certain objections as well as much support. The process increases the proportion of scrap rubber by reason of the difficulty in catching all the latex as it flows down the channels, but this loss may be prevented by care and promptness in collecting the scrap.

In favor of the system it is urged that the process of incision is more readily adaptable to bark growth than the other systems of tapping and that theoretically at least the system gives a longer yielding life to the tree.

The experiments were tried to learn whether bark renewed from below only gave as much latex as the bark after the total removal of the bark. It was known that where bark was cut away daily the renewed bark gives more latex than the original. The outcome of the experiments is still uncertain and will be for at least a year, but present appearances all point to an affirmative answer.

Manufacturers First Seek Uniformity

One of the drawbacks to plantation rubber so far as a material element in manufacturing is the fact that it is not uniform in quality. Even the product of the same plantation varies somewhat from the viewpoint of the manufacturer. The position of the manufacturer is that where he makes a certain line of goods requiring identical qualities in the material used throughout a manufacturing year, he can never be certain that a certain grade of plantation rubber will be absolutely uniform today and 6 months from now.

This is explained by the producers on the theory that they are not closely enough in touch with the manufacturers. They produce the rubber according to their best information as to the requirements of the market and the manufacturer purchasing in the market sometimes finds that the quality of the same grade of rubber varies sufficiently to force him to change his manufacturing processes or secure a supply of rubber that tallies with his original supply upon which the processes were based.

For instance, he may find traces of acetic acid or alum in one lot that were not present in the original or former shipments and the presence of such chemicals may render the rubber unfit for his particular purposes. Francis Martin, a manufacturing chemist, recommended that the producers eliminate all traces of coagulating mediums and water from their products before marketing. This would have the effect of making it unnecessary to wash and dry the product before use and would serve to enhance its value.

Would Pay More for Even Grades

Some of the makers who consume large amounts of plantation rubber feel very strongly on the subject of uniformity. Even quality is made a secondary consideration with them. Opinions have been expressed by men who are real factors in the trade that an advance of 15 cents a pound for certain grades would be gladly paid by the manufacturers if they could be assured that the rubber of a certain grade would be always of uniform characteristics.

The rubber producers are striving in every way to bring about this result and some of the leaders assert that they would willingly take 2 cents a pound less for their product if they could be assured that it was uniform.

Vulcanization is regarded as the supreme test and a movement is now under way to install small vulcanizing plants on several of the big Ceylon plantations so that actual working tests of the grades of rubber can be made right on the ground. The manufacturer has only a general idea of what is going to happen when he employs a new grade of rubber and he finds his proof of the pudding in the results attained. According to the scientists, vulcanization is the surest way of classifying rubber so that if the manufacturer knows that a certain grade will vulcanize according to certain methods and the product will serve to gain a certain result, he can purchase freely to the benefit of everybody concerned.

THE AUTOMOBILE is indebted for much of the information contained in the foregoing to A. Staines Manders, organizing manager of the International Rubber Exposition, which will be held at the Grand Central Palace September 23 to October 3.

View of plantation in full bearing, showing close-planting system which is not favored by all the pioneer leaders of the industry

Digest of the Leading Foreign Journals

Racing Speed Does No Harm to Perfect Road—French Demountable Wire Wheel—The Fiat Fire Pump—Load Suspension a Factor in Tire Wear—Cottin-Desgouttes Construction Features—Cheap Scavenger for Cast Steel

CAR Speed and Road Conservation—In its report on the recent *grand prix* race over the Dieppe course in France, the committee on sports of the Automobile Club of France takes note of the condition of the roads as observed before and after the racing cars had passed over them twenty times. This part of the report reads in substance as follows:

Despite the length of the contest and the number of vehicles engaged, the road in a general way suffered very little. On the straight stretches it was in perfect condition. In the places where the drivers could urge their motors, some detrition of the surface was observed, and it is possible to maintain that this result should not be ascribed to the speed but rather to sliding of the wheels on the ground, this sliding being due to misproportion between the relatively small weight of the cars and their excessive powers. The road in this case served as a brake band, absorbing the surplus power which was not utilized for propulsion.

The Dieppe race is a new demonstration of the fact that on a perfectly compacted road surface speed, weight or power, when held within the already widely extended limits characteristic of racing cars, are not factors in the destruction of roads; on the contrary, the weight, which causes adhesion to the road, should be in such a ratio to the power available at the motor shaft that the sliding of the driving wheels becomes impossible, and this for the protection of the tires as well as of the road. Anti-skid tires with suitable projections on their tread, in as much as they improve the adhesion certainly check the sliding of wheel and reduce the wear of the road. It is to be noted in this connection that the majority of the vehicles were equipped with anti-skid tires on the first day and that on the second day the few smooth tires which formed the exception from this rule were replaced with anti-skid tires.

It is known that accelerations and retardations are especially harmful to roads and tires. In this respect it was noticed that in front of the grand stand the road remained in perfect condition, although starting and braking were frequent at this point. The inference is that great progress must have been accomplished in the flexibility of motors as well as in clutches and brakes.

The vehicles in most cases hugged the road closely, and the well-studied load distribution methods, spring suspensions and spring moderators certainly contributed to this result, so favorable for roads and tires. It must be stated, however, that at the foot of hills, at the spots where gear was changed for the climb, considerable road detrition was observed. The speed change showed its effects; which argues in favor of progressive gear change.

At the turns the heaviest vehicles skid at the rear at the moment when the straight direction is resumed, and the lighter vehicles skid with all four wheels. This fact was verified at the hairpin turn (*la Fourche*) where the road was plowed up. The banking of the turn which is so valuable for the security of the vehicle, seems ineffective for conserving the road surface. It may be considered settled that the whole width of the road should be tarred at turns and also that repairs with crushed stone should be made over the whole width at these places and should be given time to settle. The fact that the stone replacements on the roads of the race were not recent combined with favorable showers to conserve their good condition.—From *Bulletin Officiel*, July.

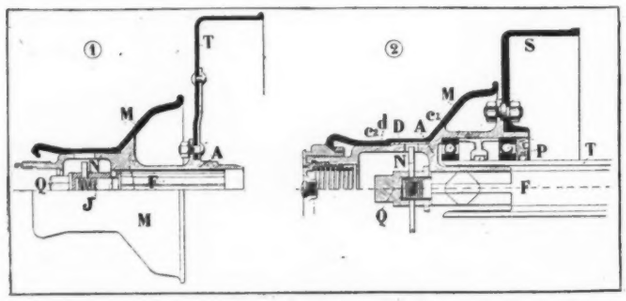


Fig. 1—Mounting of the fixed hubs in R.A.F. demountable wire wheels on different wheel-driving shafts—(1) on a non-floating type of shaft—(2) on a full-floating type of shaft

Wire Wheel Construction—The demountable wire wheel, which is known as the R.A.F. and made in France embodies certain details of design and appearance which distinguish it from the well-known Rudge-Whitworth wheels made in England. The differences relate mostly to the method of mounting the wheels on the axles and are shown in the accompanying illustrations, Fig. 1 (1 and 2) and Fig. 2 (1, 2 and 3). The wheels themselves comprise the steel rim, the triple rows of spokes and the pressed steel hub, the latter, M in Fig. 1, being formed with two conical faces, *c1* and *c2*, by pressure against which the wheels are held in their planes when mounted. The pressure is exerted by means of the mechanism of an auxiliary hub which is in all cases permanently—though removably—mounted upon the wheel spindle. It is the auxiliary hub which carries the ball-bearings and, in the case of the rear wheels, the brake drums. It rotates on the spindle in front wheels and with the spindle in driving wheels. Fig. 1 (1) shows the mounting of the auxiliary hub on the end of a wheel shaft which drives the wheel under load stress, while Fig. 1 (2) shows the mounting on a wheel shaft of the full-floating type, in which the load is supported on the tubular axle surrounding the wheel-driving shaft. Fig. 2 (1) shows the mounting of the auxiliary hub in a front wheel. Externally these hubs, Fig. 2 (2), all look alike, and the caps which lock them to the pressed-steel wheel-hubs by means of the internal locking barrels shown in Fig. 2 (3) are all of the same design, externally and internally. The auxiliary or, as it might be called, the fixed hub is formed with a conical surface E which serves as abutment for the conical part c1 of the wheel hub,

and the latter is pressed up against this conical face by means of the screw cap L, Fig. 2 (1), which is threaded upon the outer end of the fixed hub, while the exact centering of the wheel is secured by the smooth cylindrical portion G of the fixed hub to which there corresponds a similar internal smooth cylindrical portion in the wheel hub. The toothed zone D on the fixed hub similarly corresponds to an internally toothed belt in the wheel hub and their engagement prevents rotation of the wheel on the fixed hub. In order to provide a secure lock for the screw cap, the fixed hub contains the barrel or plug D, Fig. 2 (3). This barrel which is pushed outwardly by a strong spring B, Fig. 2, (1) and (3), is provided with two toothed belts of which one goes into engagement with a corresponding toothed belt in the interior of the fixed hub, unifying these two parts, while the other engages an interior toothed belt cut in the interior of the screw cap L. This combination constitutes, then, a very secure lock with the assistance of the outward pressure of the spring B which amounts to about 50 kilograms. And to hold the barrel in place, preventing the spring from throwing it out, a groove K in the fixed hub receives a split ring C, Fig. 2 (3), which abuts against the toothed portion of the barrel.

A special tool has been devised for facilitating the mounting and dismounting of this wheel. It consists in a spanner fitting over the screw cap, with which is combined a yoke with prongs which may be adjusted to enter the groove in the cap, so as to fix the tool laterally, and with a screw device for pressing the barrel inward against the resistance of the spring while the screw cap is being released by the turning of the spanner. Another special tool serves for extracting the fixed hub whenever this operation may be desirable for examining ball-bearings or brakes.—From *La Vie Automobile*, July 27.

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Fiat Fire Engine—The rear end of a fire engine chassis as built by the Fiat company of Italy is shown in Fig. 3. It is driven and operated for fire extinguishing purposes by a 45 horsepower gasoline motor, and the complete vehicle with 17 men on board and equipped with ladders and a reel can be driven on level ground at a speed of 25 kilometers per hour and is capable of climbing grades of up to 16 degrees. The chassis alone weighs about 2100 kilograms. According to a statement in *Zeitschrift des Vereines Deutscher Ingenieure*

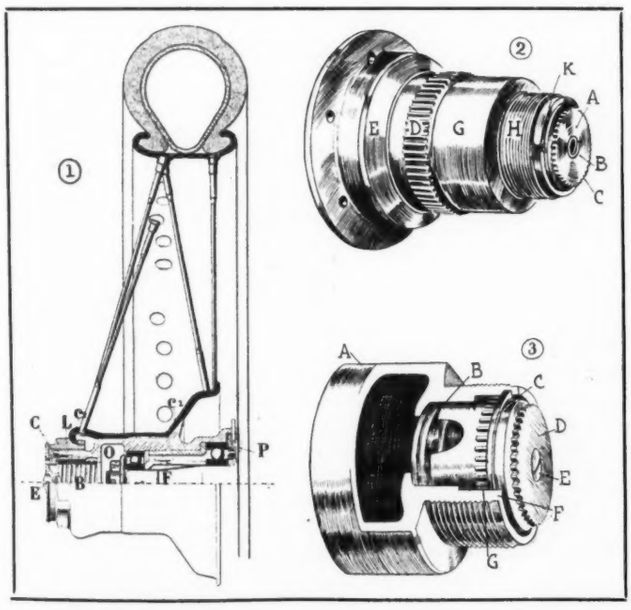

Fig. 2—(1) R.A.F. demountable wire wheel on a front-wheel spindle—(2) auxiliary hub upon which pressed-steel wheel hub is mounted—(3) the barrel or plug serving, together with the screw cap, to secure the wheel

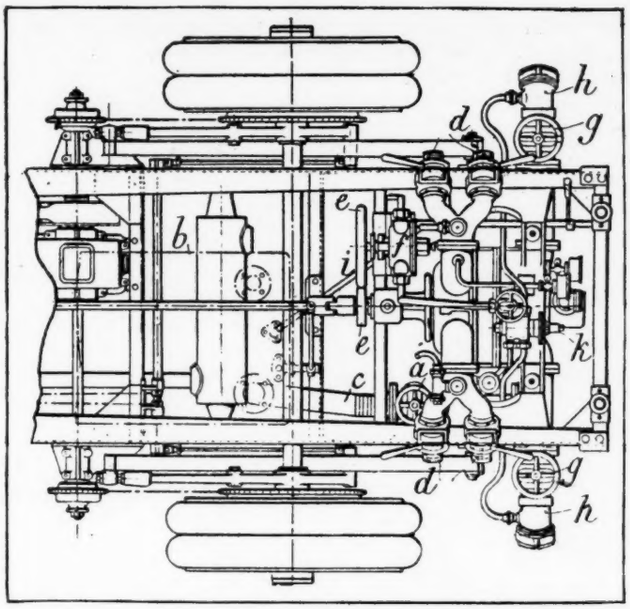

Fig. 3—Rear end of Fiat fire engine chassis with centrifugal pump

the three-cell centrifugal pump can draw water from a depth of 4 meters and discharge it at the rate of 1,200 liters per minute with the motor going at 2,000 revolutions per minute and the manometer pressure registering about 10 kilograms per square centimeter. At still higher motor speed and the pressure increased to 16 kilograms, the discharge can be raised to 1,600 liters. As will be noticed from the drawing, the vehicle is chain-driven, and the pump shaft is in continuation of the transmission shaft extending from the gear box and may be coupled to it.

The method adopted for starting the pump is somewhat different from any employed in German fire engines of the same general type. There is mounted upon the chassis a water tank *b* which normally is connected with the water jackets of the motor cylinders but whose content, when the valve *e* is opened, is also driven by the cooling-water pump into conduit *c* and thence into the four pipe joints *d* where fire hose are attached. As soon as the pump is to be started and its shaft has been coupled to the motor, a friction gear *ee* communicates the rotation of its shaft to an air pump *f* which evacuates the air from the suction conduits of the centrifugal pump which may be connected with the latter at any moment by means of the joint *h* and the valves *g*. Consequently, when this is done and as soon as the centrifugal pump has consumed the water in the tank *b*, these suction conduits are filled with water and the centrifugal pump continues its work through them, drawing from the local water supply. It also replenishes the tank *b* with water from this source through the pipe *i*. The connections between the air pump *f* and the suction conduits *h* are opened or closed by means of a six-way valve *k* placed at the rear of the vehicle.—From *Le Génie Civil*, August 3.

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Metal Wheels, General Design and Tire Wear—A correspondent cites his experience with two fast cars, the motors and chassis of which were practically alike, excepting that the last one acquired by the experimenter had a wheelbase about 10 inches longer than the first one. In both cases Rudge-Whitworth wire wheels were used, but in the first vehicle the carriage body was built out over the wheels and also had a considerable rear overhang, extending several inches farther back than the frame reaches, while in the second vehicle the whole carriage body was kept entirely within the space between the axles and so narrow as to clear the planes of the wheels. Yet, the weight of the second car was 20 kilograms greater than that of the first

one. With the first car, three tires had lasted only for 2,000 kilometers and two other ones for 5,000 kilometers, and this had been considered very unsatisfactory, although the average speed at which the car had been driven had been very high—tending up toward 60 miles per hour wherever the road would permit. With the second car, the tire results were much more satisfactory, none of the tires showing signs of giving out after a mileage of 5,600 kilometers attained at the time when the report was rendered. The upshot of the correspondent's reasoning is that while the wear of tires may be much affected by the nature of the wheels it is perhaps still more affected by other factors relating to the distribution and suspension of the weight of the chassis, the carriage body and the occupants, which are seldom considered as of great importance in this connection.—From *La Vie Automobile*, July 27.

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Details in a Well-Known Car—In a brief description of the latest Cottin-Desgouttes cars, which are among those most used in the hilly portions of France, some details are mentioned which seem worth noting. The carbureter takes its heated air from the space between the cylinder casting and the valve casing, thereby renewing the air in this space and contributing to keeping the valve springs and stems cool. The carbureter is heated by a piping, D in Fig. 4, which connects directly with the water jacket and also acts as a bracket assisting in supporting the carbureter. The pan marked E is cast in one with the upper portion of the crankcasing and takes the place of the mud pan with evident advantages. A wire screen B prevents the oil in the bottom part of the casing from swashing. A force pump with spring-pushed ball valves drives the oil through tube A to a horizontal distribution-tube running lengthwise of the casing at a level higher than that of the crankshaft, whence it drops through short leads to the three shaft bearings, and from these it is thrown by centrifugal action in the now usual manner through bores in the shaft, the crankpins and the crankpins to the connecting-rod bearings.

A special method has been adopted for obtaining a brake effect upon the transmission shaft when disengaging the clutch for the purpose of a gear change while avoiding this effect when the clutch is slipped for other reasons. The clutch is of the multiple plate variety, as indicated in Fig. 5 at B, and a conical brake band C is mounted upon the hollow member A upon which the clutch spring RR acts when compressing the clutch plates. This spring is made in two parts, however, of which the front one has more convolutions than the rear one, and between these two parts there is slidably mounted upon the squared shaft a female cone D which, when pressed into engagement with the brake band C, serves to retard the transmission shaft as desired. But when the clutch spring is drawn back only a little, the two brake elements do not come into contact. C moves back farther than D, as the part of the spring with which it moves is longer, but D also moves back somewhat. Only when the clutch spring is fully compressed, completely releasing the multiple plate clutch, is the condition brought about under which C overtakes D, retarding the rotation of the transmission shaft and facilitating the contemplated gear change.

In the front wire wheel construction used for Cottin-Desgouttes cars a notable feature is the end-thrust ball bearing which permits mounting the wheel on the spindle without undue tightness and yet with adequate provision against play. Of the two races of this bearing, one, B in Fig. 6, is secured upon the spindle and the other, C, is secured in the wheel hub, and the road shocks are thus absorbed in the bearing from whichever side they come.—From *Omnia*, August 3.

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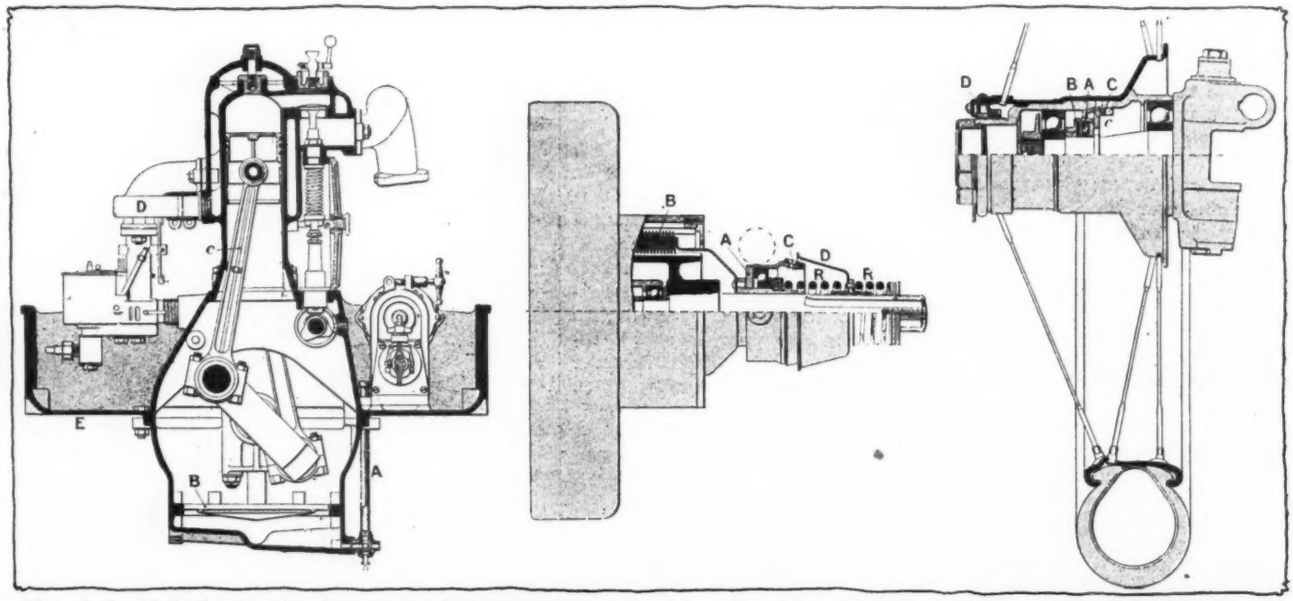
Improved Iron and Steel Castings—An advancement in the art of obtaining castings free from pipes and blowholes by the use of silico-calcium as a scavenging agent in the melt has been substantiated through experiments by Professors Donath and Luszner at the technical college of Brünn, Austria. It has a high affinity for sulphur, forming calcium sulphate, while the silica combines with the oxides and other impurities (nitrogen) and forms a slag which floats on top of the melt. With iron containing 26 points (a point being one hundredth of 1 per cent.) of phosphorus and nearly 10 points of sulphur, the silico-calcium treatment reduces these proportions to 20 points of phosphorus and 6 points of sulphur. In the case of an open-hearth steel, the treatment affected the contents as follows: 72 points of carbon was reduced to 70 points, 12 points of silicon was raised to 18 points, 92 points of manganese to 95 points (this gain apparently representing only the admissible error in the determination), 10 points of sulphur was reduced to 6 2-3 points and 7.4 points of phosphorus to 5.4 points. The sulphur and phosphorus taken out of the metal were found in the slag. The mechanical properties of the steel obtained in this manner are identical with those of steel treated with aluminum, with the additional advantage that the spots or grains of alumina often found in the latter are avoided.—From *La Technique Moderne*, August 1.



Figs. 4, 5 and 6—Construction features in Cottin-Desgouttes cars—Fig. 4 showing carbureter, mudpan and oiling system—Fig. 5 showing new combination of clutch and brake action—Fig. 6 showing wire wheel construction with internal end-thrust ball-bearing

New Gray & Davis Starter in Detail

Six-Volt Compound-Wound Motor Has Been Added to Lighting System Formerly on the Market

Pedal-Operated Device Will Spin Heaviest Motor for Sufficient Time to Start in Cold Weather

THE Gray & Davis self-starter, recently announced in THE AUTOMOBILE, is of interest to automobile engineers in that it is especially adapted to the use of a 6-volt current. This voltage has been selected by the Gray & Davis concern for two reasons: first, that it requires no special battery equipment, and, secondly, that it may be added to the Gray & Davis lighting system without adding any undue complexities to the wiring scheme of the car. The added complication of the electric motor is almost imperceptible, being merely the mounting of the motor itself below the floor boards of the car and the addition of a starting switch located near the battery that is generally placed on the rear right end of the car next to the side channel frame.

There are two sizes of the starter. The largest is the variety that will be seen in the 1913 Peerless cars. It is heavy enough and develops enough power to turn over the largest of the six-cylinder motors for a sufficient time to start it in the coldest weather. The motor on this large size starter weighs 70 pounds. Unlike most of the electric starters which have recently been put upon the market this is not a motor-generator. The generator is separate and independent, being mounted on the side of the motor. The starting motor is never in operation unless the foot is on the pedal that is used to start the car.

Motor Is Geared to Flywheel

The motor is of the compound wound type running on direct current and is geared to the flywheel. The reduction is about 20.8 to 1 from the motor to the flywheel. The heavier of the two motors is designed to turn over at 1,200 revolutions per minute on a current consumption of 200 amperes. The lighter motor, which is adapted for starting purposes on the smaller four-cylinder motors and weighs about one-half as much as the larger, will turn over at 1,500 revolutions at a current consumption of 100 amperes. The weight given by the manufacturers of the smaller starting motor is 38 pounds. The voltage of the smaller motor is the same as the larger motor, being normally rated at 6. Both the motors have been shown by the manufacturer's tests to be capable of operating under an overload of nominally 200 per cent. In case the gasoline motor should suddenly go dead on a railroad crossing the starting motor can be called into action and will carry the car across. The makers state that the storage battery they use in connection with the lighting and starting system will be sufficient to carry the car for 2 miles without the aid of the gasoline motor.

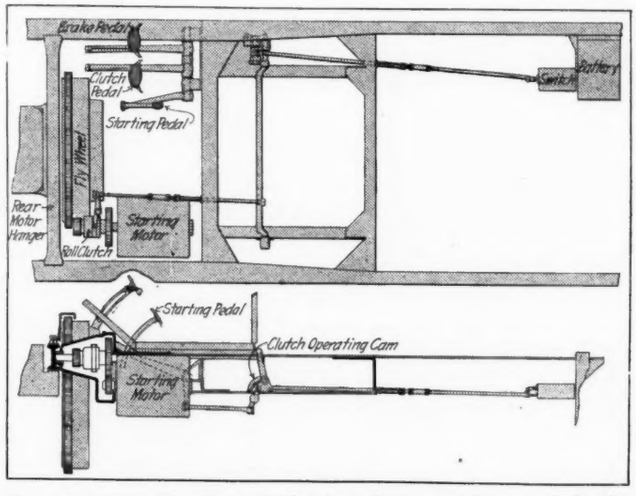
The installation of the starter is shown in elevation. The upper or plan view shows the starter's position relative to the control pedals and to the longitudinal frame members. With left control the starting motor would be located on the right side of the car so that there would be no complication in the brake and gear-shifter mechanism. The plan view also shows the relative positions of the starting pedal, switch, battery, etc., as well as the mechanism through which the apparatus is under control. When the pedal is depressed the switch is thrown in and the gears are put in mesh through which the starting motor drives the motor. After the motor is turned over and started the clutch is engaged in the usual manner, there being no change in any way in the clutch mechanism generally fitted to the car. When the clutch is let in and the motor speeded up the roll clutch indicated in the illustration comes into action and cuts out the motor so that it rests absolutely idle while the car is in motion. As shown in the plan view, both the rods which lead to the switch located in this case on the rear right of the chassis frame and the rod which controls the engagement of the starting motor gearwheel with the flywheel gear are adjustable for length. This is accomplished by a left and right screw device similar in action to a turnbuckle. The clutch which is used for the purpose of disengaging the electric starter may also be regulated to throw off the starting mechanism at any desired speed.

The dynamo, which is familiar to those who have used the Gray & Davis lighting system in the past, is what is known as the constant-speed type and can be driven from the motor or any other moving shaft by gear, belt or chain. The special centrifugal governor takes care of any of the varying speeds of the motor and keeps the armature revolving at a uniform rate by allowing the clutch to slip when the speed of the motor increases. When the motor is running so slowly that it is below the charging rate of the dynamo an electric cut-out comes into play and prevents the current from discharging back from the electric battery through the dynamo.

Centrifugal Clutch Important

The centrifugal clutch in the dynamo is the key to the system in that it not only is the part that keeps the current in the battery for use in starting the motor, but permits the battery to be charged at the normal rate. The centrifugal clutch combines a centrifugal governor with a friction clutch. The latter consists mainly of two disks, one of aluminum faced with asbestos fiber 1-8 inch thick running on three ball bearings. The other disk is of smooth cast iron. The aluminum disk is the variable speed disk, as it always runs at the same relative speed as the motor, being driven therefrom by a belt or by gearing. The cast-iron disk is pressed against the asbestos fiber facing by a strong vanadium spring, which is controlled by the centrifugal governor weights. When the speed of the dynamo mounts over 1,200 revolutions per minute or what would correspond to a car speed of about 12 miles an hour, the governor weights fly out to such a distance that the clutch releases its hold sufficiently to permit it to slip. This keeps the armature speed of the generator down to the required 1,200 revolutions per minute.

The cut-out which prevents the discharge of the battery through the dynamo at low speeds operates on the magnetic principle. When the generator speeds up the electric magnet attracts the magnet armature and closes the circuit between the dynamo and the accumulator battery.



Plan view and elevation of the installation of Gray and Davis electric starter

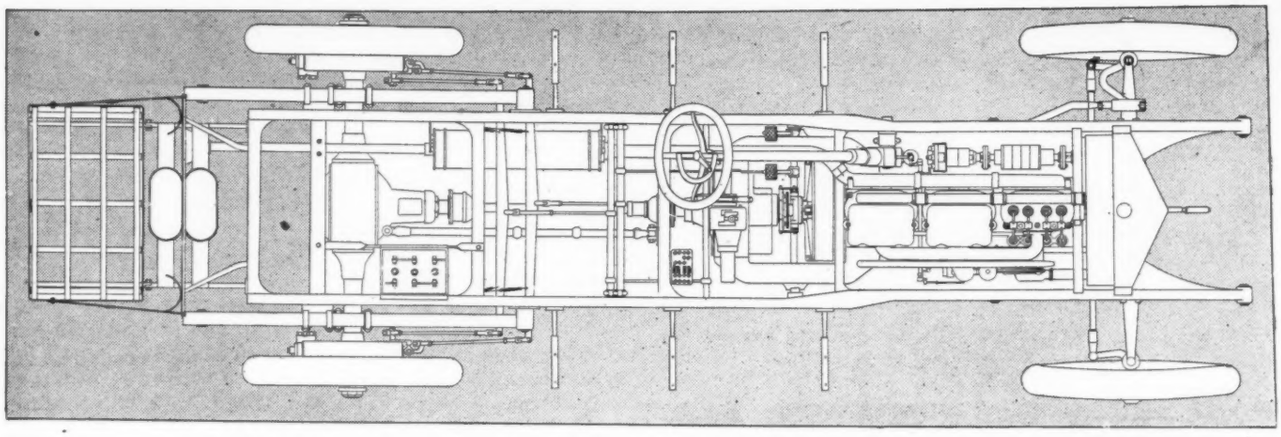


Fig. 1—Plan view of the new Knox little six chassis brought out for 1913 under the name of model 46

Knox Brings Out a New Six-Cylinder

Four Models on the Market for 1913—An Increase of Stroke Made on Four-Cylinder Motors

Important Body Refinements Adopted—Silence Made an Important Feature

FOUR models of cars will be produced by the Knox Automobile Company, of Springfield, Mass., for the season of 1913. Two of these, the models 44 and 45, are four-cylinder cars of identical specifications except for the wheelbases; while the remaining two comprise the big six car which was produced for 1912 by the Knox company and which is to be known next season as the model 66, and the little six or model 46. The little six is the only entirely new model added to the line and while the other three are put out under the 1913 date only minor changes have been found necessary.

The changes made in the models which have been continued for this year have been principally in the line of body refinements except one important change in the four-cylinder motor, that is, the increase of the stroke by 3-4 inch. The stroke of this motor was formerly less than the bore, the dimensions being 5 by 4 3-4 inches. In making the stroke 5 1-2 inches for the coming season the stroke bore ratio has been changed from .863 to 1.100. The other refinements incorporated in the 1913 models include a three, instead of a two-blade fan, oil-gauge on dash, clock speedometer, slides over pedals to prevent gases from entering passenger compartments, Perkins acetylene starting and lighting outfit, windshield base moved to top of cowl instead at begining of cowl, choice of horizontal or vertical tire carrier the horizontal tire carrier has a permanent trunk rack and the vertical tire carrier has a folding trunk rack, changed shape of mud guards, a graceful reverse curve being used this year instead of the straight type seen in the 1912 cars. The door, latches are now concealed whereas last year they showed above the body line.

New Radiator Is of V-Shape

Chief interest centers in the little six known as model 46. This is an entirely new car and involves features which are new to Knox design. The first point which strikes the eye is the V-shaped radiator. This radiator has been adopted by the Knox company on account of the splendid results obtained with it in racing. On opening the hood of the car it will be seen that in this model the engineers have cast the cylinders in pairs, not following the practice in vogue with the Knox four-cylinder cars where the cylinders are cast singly. Other departures from standard Knox practice: the placing of the intake and exhaust valves on opposite sides; the use of bolted-on instead of clamped-on manifolds; 45-degree conical valves are used instead of straight sided, although the other features of the cylinder head construction remain practically the same; cam rolls of large diameter are used with a spring inside the push-rod guide to hold the roll on the cam, thus making for silence; rounder cam contours are used; chain drive is used for the camshaft and magneto shaft; silence is sought in every direction, aluminum valve action covers being placed over the rocker arms on to that of the cylinder; bosses are cast in the cylinders to take the Perkins starting system and allow the acetylene to flow in such a way that a whirring action of the acetylene gas results, making starting more certain; nickel-plated wiring containers are mounted on the cylinders; a wood knob is fitted on the top of the gear shifter lever; torsion rod is placed on right instead of left of car; two separate entrances of water manifold to the radiator and extra large brakes are used. In all other essential points the construction of the little six-cylinder car is similar to that of the other models.

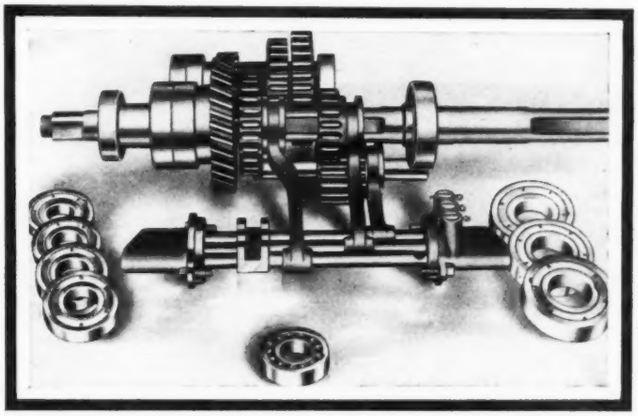


Fig. 2—Assembly of Knox gearset showing annular ball bearings

The bore of the little six car is 4 3-8 inches and the stroke 5 1-2 inches giving a bore-stroke ratio of 1.256. The cylinders as stated are cast in pairs and are of grey cylinder iron. The cylinder heads are all detachable and when so detached carry the valves directly with them as shown in Fig. 5. To remove the cylinder heads in order to reach the cylinder of the motor for cleaning out carbon or for any other reason, it is only necessary to unbolt the water manifold and take out the six bolts of the flange that holds the head to the body of the cylinder. The cylinder head can then be lifted off and the interior is exposed to view. The sections of water manifold above each pair of cylinders may be removed independently if desired and this will permit of the

removal of each pair of cylinder heads singly. The main cylinder water-jacketing is connected to the water-jacket of the head by a small by-pass which is removable and which is rendered water-tight by a copper asbestos gasket. These small by-passes are seen in Fig. 4, where the left side of the motor is shown, they are located between the exhaust manifold and the metal pipe holding the ignition wires. As may be seen they are held in place on the cylinder by two bolts, one at the top and the other at the bottom of the by-pass.

The pistons are of grey iron and are fitted with four rings, three of which are above the wristpin and the other is below. The wristpin is fixed and is held secure against an oscillating movement by a stud bolt which passes directly through the bushing into the boss on the interior of the piston. This construction has been used in the four-cylinder Knox cars during the past and is illustrated in the part sectional view given at Fig. 3, where the four-cylinder Knox is shown. The connecting-rods are of I-beam section and are arranged to take a lead-pipe which is a factor in the oiling system as will be explained later. The crankshaft has a bearing between each of the separate cylinder castings making four main bearings on the little six cars and five on the four-cylinder model. The material from which the crankshafts are made is chrome-nickel steel, double heat treated. The connecting rods are 3 1-2 per cent. nickel steel. The camshaft which is driven by silent chain from crankshaft is also a heat treated steel and is mounted on the right side of the motor.

Valve Mechanism Slightly Changed

The valve mechanism is of the Knox type, but has been improved in some of the minor details. The points at which these improvements have been made are at the cam follower and over the cylinder heads where a unique adjustment device and aluminum cover plate have been fitted. The cam contours have been made more round also tending to give silence to the operation to this motor. This feature has not been carried far enough, however, to cause the motor to lose power, although a correspondingly slower opening and closing of the valve is a result of this change in design. As has been noted the employment of roller cam followers is used in conjunction with the changed cams. The aluminum cover plates as shown in Figs. 4 and 5 are held in place by two wing nuts, one at the forward end of the cover plate, and the other at the rear. The removal of these two nuts allows the cover to be taken off and exposes to view the compression cups and the valve rocker arms.

The lubricating scheme is what is known as the De Dion circulating system. There is no splash at the connecting-rods of any kind, the oil being delivered under pressure to all the important bearings throughout the motor. The oil pump is of the gear type and has an independent lead to each of the main bearings and to the cam shaft bearings. In the crankshaft at each main bearing there is an aperture which registers with the oil duct in the main bearing bushing. The crankshaft is hollow and the oil being under considerable pressure at the main bearing is forced against the slight centrifugal action in the crankshaft at this point and enters into the core of the crankshaft from where it finds its way through a drilled lead into the lower connecting-rod bearing. Between the two flanges of the connecting-rod there is a copper pipe which runs from the lower connecting rod-bearing to the wristpin. The upper end of this pipe terminates at the hollow wristpin bushing. The course of the oil is apparent. After entering the hollow crankshaft it

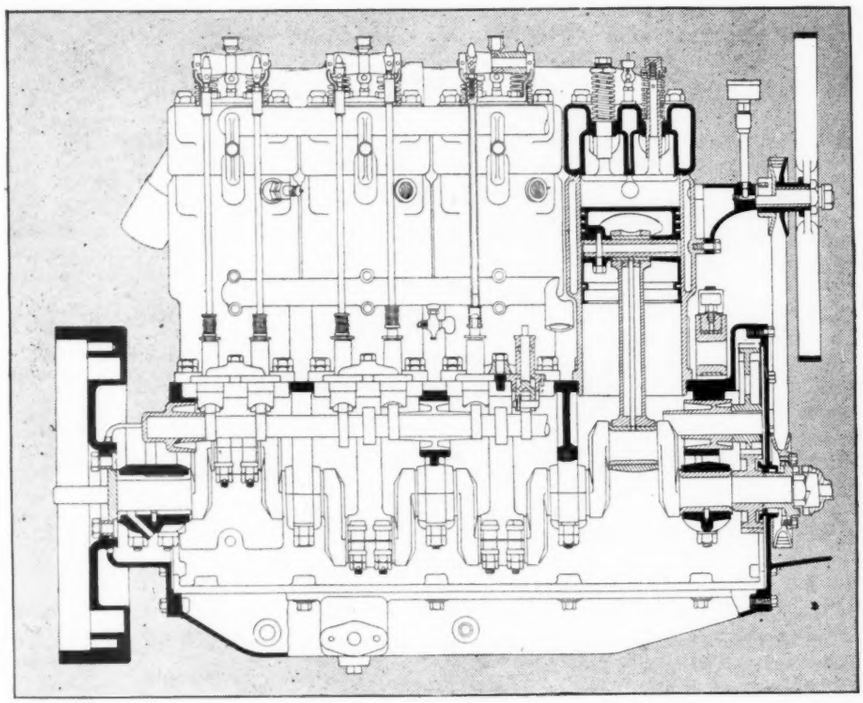


Fig. 3—Elevation and part sectional view of Knox four-cylinder motor

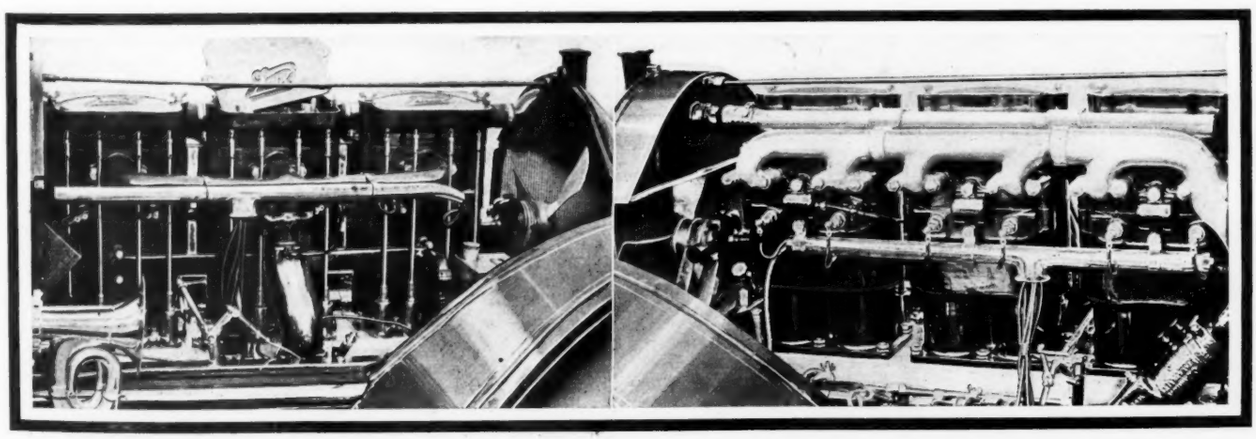


Fig. 4—Showing the right and left sides of the motor as exposed to view when the hood is lifted

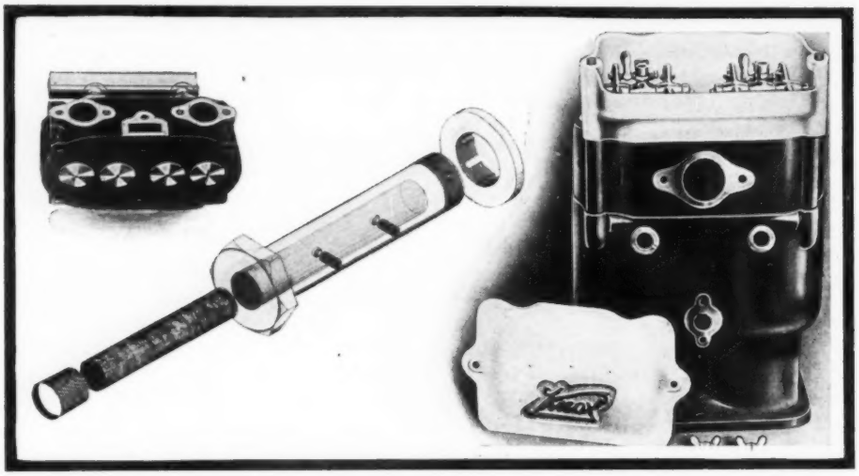


Fig. 5—Cylinders with valves, lubricated shackle bolt, assembled cylinder block

is forced up through the pipe along the connectings rods into the wristpin lubricating the bearing at this point and then passing out through the walls of the cylinder. After lubricating the different bearings the excess oil will drop back into the crankcase and will be re-circulated after having passed through a fine mesh screen.

Water Manifold Is Y-Shaped

The cooling system of the little six differs from the other model only in the shape of the radiator. This new type on the little six has a capacity of 3 1-2 gallons. The entire system including the jackets has a capacity of 28 quarts. Another distinguishing feature of the little six model is the fact that the water manifold is divided into two parts where it enters the radiator. The Y-shaped manifold is intended to subdivide the stream of cooling water as it leaves the cylinders so as to use every available part of the V-radiator. In order to get greater cooling efficiency the fan design has been changed also. A three-bladed fan is now used and tests show that a direct draw is secured through the entire front of the radiator and uniform cooling of the entire radiator surface is secured.

Two absolutely independent systems of ignition are employed on all Knox models. A Bosch magneto of the newest high-tension type is connected to one set of spark-plugs while the auxiliary system is furnished by batteries and a 4-unit Connecticut coil and timer in the case of the two 4-cylinder models, and a 6-cylinder Connecticut distributor with batteries and coil in the two 6-cylinder models. The spark-plugs are mounted on opposite sides of the cylinder walls and are placed below the removable cylinder heads. By this arrangement it is not necessary to disconnect any wiring when removing the cylinder heads for the purpose of cleaning the spark-plugs, piston heads and valve pockets. The wiring is contained in two independent nickel-plated tubes. This type of tube is deemed by the engineers of the Knox company, superior to insulated tube for the reason that should there be any tendency toward a short circuit from one of the high-tension wires the short circuit will be through the pipe containing the wires to the ground instead of from one wire to another. These nickel-plated tubes are clamped to the intake manifold on one side of the cylinders while on the other side a connection is made by a bracket held by the lower of the two bolts securing the waterjacket connection between the cylinder heads and the main part of the cylinder as may be seen in Fig. 4. The pipes give a neat appearance to the side of the motor and hold the wires securely against damage through vibration. At each spark-plug there is a hole drilled in the pipe through which the wire is lead to its respective plug.

To further carry out the ideas of the designers in having the appearance of the side of the motor as neat as possible all the manifolds this year are bolted to the side of the cylinders instead of being clamped thereto. Besides giving a neat appearance, a much better engineering job is made in that a tight connection is made between the manifold flange and the cylinder flange without as much stress being taken up on the bolts.

Necessary work, under the hood of the motor, is rendered very easy as far as accessibility goes because the engine is carried high for the low center of gravity of the car. It is not difficult to reach such parts as the fan-bearing adjustment, the carbureter adjustment screws, the oil cups of the steering mechanism or any of the other parts of the car that will require attention after a long run. Some of the adjustments are very readily effected. The fan belt may be tightened by merely pulling up on the fan after loosening the nut which holds it in place and then re-tightening the nut. The grease cups for the various exterior motor bearings are turned toward the operator so that they will be at hand when he lifts the hood. This is true of the cup on the fan bearing as well as those on the timing gear case and the steering gear.

The view of the right side of the motor in Fig. 4 shows the water-jacketing for the Stromberg carbureter although the carbureter itself is just out of view being concealed below the side frame of the car. The water is taken from the water-jacket, just below the exhaust pipe and is allowed to circulate around the carbureter, it is then lead into the suction side of the centrifugal water circulating pump. A drain plug is fitted in the lower part of the carbureter water-jacket which permits of the draining out of this jacket if it desired to run the motor without it in warm weather, according to the advice of the carbureter manufacturer. The rest of the gasoline system is of standard design. The feed to the carbureter is by gravity, the tank being contained under the front seat in the touring models while in the roadster types or raceabouts it is placed back of the front seats. The capacities of the gasoline tanks in use on the different models of cars are as follows:

Model	44	45	46	66
Touring	20 gallons	20 gallons	24 gallons	20 gallons
Raceabout	16 gallons	16 gallons	24 gallons	16 gallons

Figures on fuel economy are not now extant but the oil consumption of the Knox cars is stated to be 1 gallon to 800 miles on the six-cylinder cars and 1 gallon to 700 miles on the four-cylinder models.

Details of Clutch Construction

The clutches used with all the models remain unchanged from previous years. They are of the three-plate type with cork inserts in the center plate. The clutch is run dry, the cork having the quality of requiring no lubrication. The fly-wheel completely

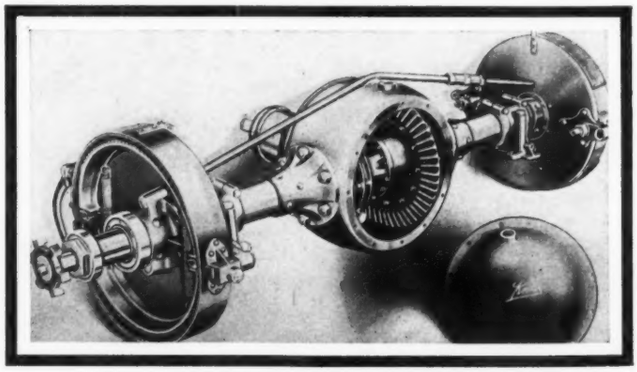


Fig. 6—Rear axle, showing brakes and differential plate removed

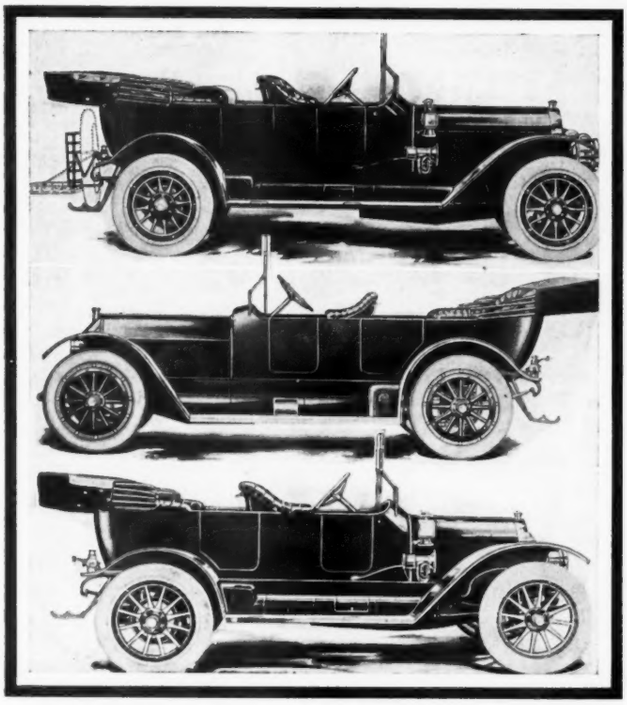


Fig. 7—Knox model 66, six-cylinder torpedo with folding baggage carrier. Model 46, little six torpedo, note the V-radiator. Model 44, the smallest chassis with a torpedo touring body.

incases the clutch and renders it dirt and waterproof. There are sixteen spiral clutch springs used with this clutch, they are arranged in a ring within the fly-wheel housing and put the desired pressure on the central driving plate which is provided with the cork inserts. Pressing down on the pedal relieves the pressure from the drive plate and allows the clutch brake to come into action thus stopping the spinning of the shaft and rendering it more simple to change gears. The clutch brake consists of two friction plates located between the clutch and the gearset which are brought into contact the instant the clutch is fully released. The friction plates are faced with Raybestos, which can be renewed if it becomes worn after long use.

Three-Speed Gearset Employed

The Knox company is among those who are believers in the three-speed gearset. The selective type is used, the shafts being of 3 1-2 per cent. nickel steel. The carrier shaft has four splines and is made of the same material as the other parts of the gearset. The entire gear-box assembly is illustrated in Fig. 2 where the four-spline shaft is shown together with the gears and the imported annular ball bearings upon which the shafts are carried. The length between bearings is short as may be seen from the compact arrangement of the gears. The gearshift quadrant is a modified H the reverse being one more notch to the left than the main body of the H. The center control now used on all models enables the lever to be near the gear-box itself and hence reduces the number of levers through which the control of the transmission is effected and allows of a somewhat easier shift.

A universal joint housed in a leather boot is placed just behind the gear-box and transmits the drive from the gearset to the propeller shaft. The drive through the nickel steel propeller shaft is a straight line when the designed load is carried. In the little six, contrary to usual practice, the torsion rod is mounted on the right side of the differential housing. At the rear end of the propeller shaft another encased universal joint is fitted through which the drive passes directly to the floating bevel gear rear axle. Some of the details of this axle may be seen in Fig. 6 which shows the axle with the differential cover plate removed. The axle bearings are Hess Bright ball and the pinion is integral with the shaft. The brakes are also shown in this illustration and as may be noted, they are of the expanding and contracting types acting directly on the rear wheel drums. The emergency brakes are the expanding while the regular set are the contracting.

The front axle is a nickel steel drop forging with the wheels and pivots mounted on Timken roller bearings. Nickel steel Elliott steering pivots are used, taper fits being utilized in conjunction with a nut and cotter pin fastening allowing the pivot levers to be taken up in case of wear. The steering gear itself is of the irreversible double thread and nut type fitted with adjustments which render it possible to take up lost motion throughout its mechanism.

Cold pressed nickel steel frames are used. The depths of these vary at different points through the length in order to meet the different requirements at different points of the chassis. Three cross frame members are used, one at the rear, another amidships and the third just in front of the flywheel. The springs are semi-elliptic in front and three-quarter elliptic rear on all models the lengths and the wheel sizes of the different models being as follows:

Model	44	45	46	66
Front	42 inches	42 inches	42 inches	42 inches
Rear	50 inches	50 inches	54 inches	50 inches
Wheels	36 x 4½	37 x 5	37 x 5	38 x 5½

The same size wheels are used all around on each car and they are all of the wood artillery type. The rims are all of the Fisk bolted-on type with Fisk demountable rims as standard equipment. Hand-buffed upholstery is used throughout and battleship grey, Brewster or Thistle green, blue royal purple and a number of other colors are optional with the purchaser of Knox cars.

The equipment consists of a full electric lighting system on the sixes and on all models a glass front, dash clock and speedometer, combination bulb and electric horn, motor-driven tire pump, gasoline gauge, shock absorbers, coat rail, robe rail, foot rail, floor mat, tire carrier, jack, baggage rack, tire pump (hand), tire repair kit, set of tools, complete set of lamps and headlights. The headlights are gas on the four-cylinder cars. On the limousine bodies or other styles of town car folding seats, speaking tubes and various other accessories are part of the regular equipment.

The enumeration of the principal innovations given above shows that in the execution of its latest model the Knox company's engineers have well followed the trend of European and American design, both inasmuch as efficiency of the mechanism and comfort of the passengers are concerned. At the same time, none of the well-approved principles of design or construction have been thrown overboard in the building of these latest models. In every respect, progress has been coupled with caution and all important changes were made only as a result of long-continued experimenting.

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PAINTING RADIATORS is a peculiar sort of work, remembering that whatever color one puts on the radiator frame and front will be continually exposed to a very high degree of heat. It is for this reason that all makers have practically agreed that black paint is one of the best and most durable colors for the radiator. The proper method of painting the radiator is to apply a very thin coat of lampblack in solution, and, after it has dried, to apply another equally thin coat. Lampblack has sufficient body and color depth to be effective even after only two applications, and, as it is composed of pure carbon, is not subject to decomposition as other colors which are made of chemical compounds and secured to the surface by means of organic binders. Lampblack will wear off under continued strain of service, but it will last long, as even together with the heat it suffers constantly the atmospheric elements have no effect on it. It is principally the mechanical hardships that radiator paint has to undergo in service that ends the life after a relatively short period.

Loose Clips Cause Broken Springs—Automobile and Motorcycle Records—Quick Crankshaft Changes—Winter Storage of Car—Repair on Leaky Manifold—Arguments for and Against Left Control—Motor Skips After Starting

Troubled by Breaking Springs

EDITOR THE AUTOMOBILE:—I have broken the left front spring on my car three times in close succession and am beginning to be disgusted with my misfortunes in this direction. I do not understand the car as well as I might and perhaps do not pay attention to details which I should not allow to pass unnoticed. As this is largely due to ignorance on my part I wish to correct it as much as possible. What I would specifically like to know is what to do with the springs to keep them from breaking as I am afraid to take my car over any of the roads around this vicinity. This morning I noticed that the bottom leaf of the forward right spring seems to be out of line with the others. As I noticed this same thing the day before the other spring broke the last time, I am afraid that this one is to go also at the first bad strain although it seemed tight enough when I hammered it back into line.

Port Jervis, N. Y. CHARLES FLAGG.

—The whole trouble is simply in the fact that you do not keep the spring clip bolts tight. This advice has been given scores of times through these columns and is also to be found in every instruction book brought out by car makers. With a hammer gently tap the spring leaves into line as shown in Fig. 5. When this is done tighten the spring clip bolts as tight as they can possibly be turned. When this is done nothing but an extraordinary stress will break the springs. If you are traveling in very rough country continually, it would be well to use shock absorbers or a rubber spring pad above the lower clip. This will deaden the effects of a blow and render the rebound less sharp. When springs are broken it is nearly always on the rebound.

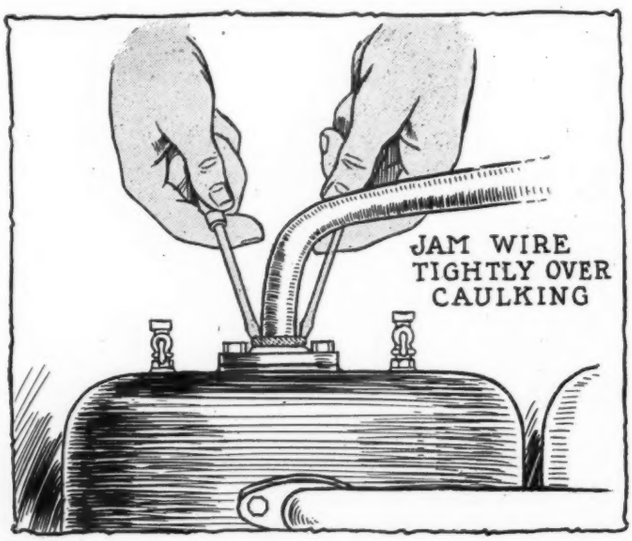


Fig. 1—A step in temporary water manifold repair on road

Automobile Faster than Cycle

Editor THE AUTOMOBILE:—Which has made the fastest mile up-to-date, an automobile or a motorcycle? Please give the names of the drivers and where the records were made.

New Haven, Conn. ANDREW MCSWETE.

—The answer to this question was given in detail on page 1179 of the issue of May 23, for the current year. Briefly, the fastest time ever made by an automobile and incidentally by any human being who afterwards lived to tell of his experiences was made by Bob Burman in the Blitzen Benz car in 25.40 seconds at Daytona Beach, Florida, April 23, 1911. This is at the rate of over 141 miles an hour. The fastest motorcycle mile record was by Ray Seymour in 36 4-5 seconds at Los Angeles on May 17, 1912, this is at the rate of very close to 99 miles an hour.

Speed in Replacing Crankshaft

Editor THE AUTOMOBILE:—In the 4-inch race held at the Isle of Man some time ago, if I remember rightly, there was a record change of crankshaft made by the Metallurgique car representing Belgium. Recently I had a discussion about replacing a crankshaft with a gentleman who claimed that it could not be done under a day. I have done considerable contest work and have seen many quick shaft and bearing changes and believe I am right in saying that it can be done much more quickly than this. What is the quickest crankshaft change of which THE AUTOMOBILE has any record?

Norristown, Pa. HENRY L. BROWNBECK.

—According to the Metallurgique agency in New York the change to which you refer was made in 8 hours. Over the same course in 1908 one of the Deasy cars sustained a broken crankshaft. The break occurred at the forward end and owing to an exceptional form of the central main bearing, which was extra long, being designed to support other parts of the motor at this point, the car was enabled to make two or three circuits of the course on two of the cylinders after it was declared out of the race. THE AUTOMOBILE has no record of official times made in changing crankshafts, but for average touring car work it requires all of a day.

Proper Way to Store a Car

Editor THE AUTOMOBILE:—I own a Hudson 33 car and do not intend to run it after the cold weather sets in. What is the best and proper way to leave a car for the winter? What I particularly refer to is the oil, water, tires, etc.

Hartford, Conn. A SUBSCRIBER.

—THE AUTOMOBILE will shortly publish a detailed story on the overhauling of the car preparatory for storing it for the winter. As far as the mere storing of the car is concerned, however, the following directions apply as regards the oil, water, tires, and parts of the car which require special attention:

(1) Drain out all the water from the radiator and the jackets, letting the draincock stay open until the entire system has run

dry. The cock at the bottom of the radiator is always placed at the lowest part of the water system so there is no difficulty in allowing every bit of the water to run out.

(2) Let all the gasoline out of the tank and drain out the carbureter. If you wish to save the gasoline put it into an absolutely gas-tight vessel so that the volatile constituents will not evaporate during the winter. If this is done carefully the gasoline will be ready for use in trying out the engine in the spring; and will probably save you the trouble of lugging a supply from the nearest garage before the car is running. Close up the tank carefully by screwing the filler cap in place in the same way as would be done were the tank filled with gasoline. Do not give the cap a couple of turns and let it go at that because the cap is apt to be knocked off and should any flakes of rust or other foreign material get into the tank the trouble which could develop would be surprising.

(3) Remove the oil drainplugs in the bottom of the crankcase and let all the oil flow out. When it has all come out put the plugs back and pour about a gallon of kerosene into the crankcase. Next, make a piece of cardboard of sufficient size to make a conspicuous label and paint these words upon it:

KEROSENE IN CRANKCASE! DO NOT RUN!

Fasten the label to the motor where it can be seen and where it will not be detached. Then when you take the motor out of storage the crankcase will be clean when drained.

(4) In the storing of the tires for the winter great care must be taken or they will show a marked amount of deterioration at the beginning of the following season. Wash the casings thoroughly with soap and water after jacking up all four wheels. When every sign of dirt, oil and grease is removed take the tires off and remove the tubes from the shoes. Next paint the inside of the shoe with graphite which may be secured from any of the graphite concerns especially for the purpose. The same directions apply to the outside of the inner tube which should also receive a generous coat of the graphite. The tubes and casings should then be wrapped securely in brown paper and afterwards in cloth. When this is done store them in a cool dry place where the temperature will remain about the same all winter. Thirty degrees Fahr. is a very good temperature for rubber which is subject to deterioration when exposed to either heat or light.

(5) If you use the gas generator which was furnished with the Hudson 33 if desired, remove all the carbide from it and give it a thorough cleaning out immediately before the residue has time to harden to the point where it has to be chipped off. Whether using a Prest-O-Lite tank or a generator, remove all the rubber connections between the copper pipes and the tank and lamps and treat them the same way that the tires were treated. If left exposed to the atmosphere and light all winter, they will be worthless in the spring. Take the lamps off, cover them with polish but do not rub this off until the spring. It would be also advisable to take them off and wrap them up, leaving them in a safe place where the lenses will not be apt to be cracked. Excelsior is excellent, and if the car owner leaves his lamps packed in this he can be sure they will be safe in the spring.

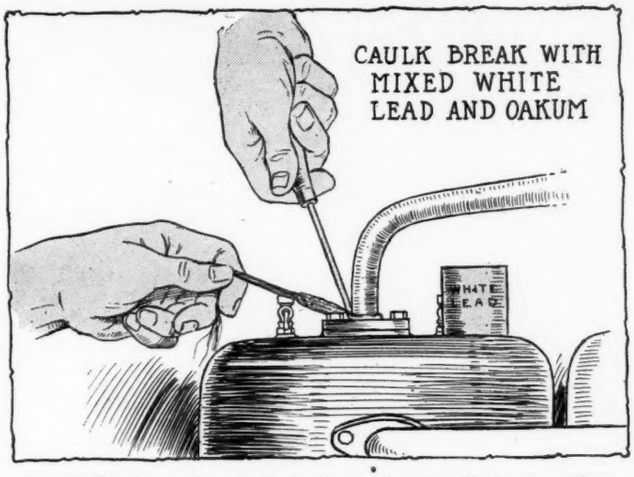


Fig. 2—Caulking the crack in the water manifold connection

Owner Makes Temporary Repair

Editor THE AUTOMOBILE:—Thinking that you may be interested in a temporary repair made while on the road the other day I am sending you a description of same, together with a few rough sketches (reproduced). After going over an unexpected obstacle in the road which gave the car a tremendous shock, I noticed that the water manifold was leaking badly just at the connection to the cylinder head. It was impractical to proceed with the water manifold in the condition in which I found it, and as the country is very hilly around this part of New Jersey I did not wish to attempt the run without any cooling water in the jackets.

Instead of taking the car to a country garage where, as I have learned by previous experience, incompetent workmen abound, I decided to make the repair as best I could myself. At the hardware store, which was also the grocery and post office, I purchased a small can of white lead and a little piece of hemp rope. The hemp rope was picked apart and made a very good form of oakum, which was very effectual for caulking purposes after it had been mixed with white lead. After first jamming a little white lead into the break, being very careful not to get too much into the interior of the manifold, Fig. 3, a small ring of the white lead and oakum was formed and pushed into the crack. This was jammed in as shown in Fig. 2, none of it being allowed to penetrate into the manifold and clog this. After being solidly kneaded down into place it formed a very tight ring which could not be depended upon, however, to hold itself in place. The last step of the repair was to form a strong supporting ring that would hold the packing in place and this was done by means of wire. A ring of wire, from which the insulation had been removed only at the ends, was twisted about the manifold just above the repair, as shown in Fig. 4. The pliers were twisted around several times in order to make this ring very tight. Then, with the aid of two screwdrivers, as shown

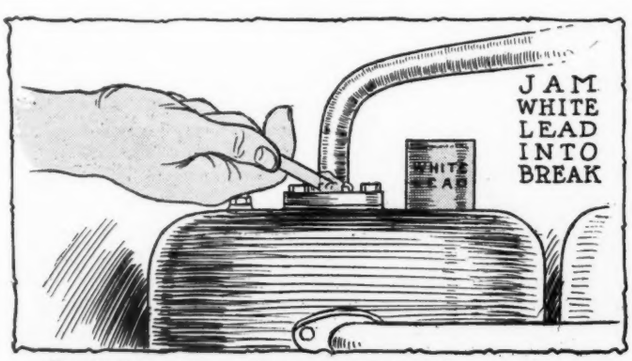


Fig. 3—White lead useful in manifold repair made on road

Fig. 4—Wires twisted to make a tight firm ring to bind caulking

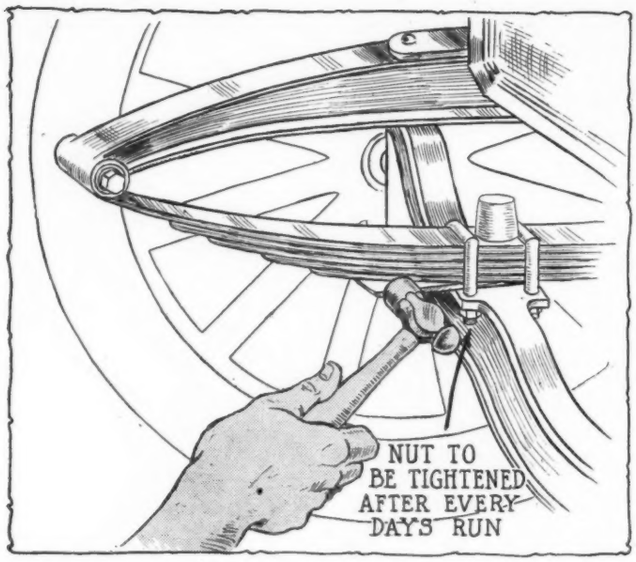


Fig. 5—Lining up the springs before tightening the slip bolts

in Fig. 1, the ring was jammed down hard over the caulking. This repair held so well that it was with difficulty removed when it became time to make a permanent repair, the latter being done by brazing a metal band around the weak point.

Hackettstown, N. J. JACK DRUMMOND.

Strong for Left Side Control

Editor THE AUTOMOBILE:—The editorial and also articles on the right or left side control question, recently published in THE AUTOMOBILE have been very interesting.

Having used both types of control for the last 2 or 3 years, under all conditions of driving in different parts of the country, I cannot see any fault worth considering with the left side control, but do think there are several bad ones with the right side. The left side control cars which I have been driving were among the very first of the high-grade cars using left side control in America, and are not and never have been experiments but the outcome of deep forethought on the part of their designers, whose aim was correct design and not selling arguments. Having just returned from a trip through some of the largest cities where traffic is dense and driving difficult, I am of the opinion that the user of a left side controlled car will never care to return to the once popular right side control. The advantages of the left side control are undoubtedly with both the passengers and the driver. Your August 1st editorial in THE AUTOMOBILE was very good and true up to the paragraph where you argue that right side control has at times in allowing the driver to "watch the ditch on the right" in passing oncoming vehicles. Right there is the weak point which kills the argument, because the basis of it is wrong, that is, "watching the ditch on the right."

Which would you prefer to take the chances with, a car coming toward you and passing you on the left at 25 to 45 miles an hour or a possible ditch on the right?

We can safely assume the ditch on the right to be 90 per cent. of the time possible to go into and come out of without serious damage, but hitting the passing car on the left will always mean more or less disaster.

Therefore you want to sit on the left so as to be sure to gauge your passing clearance with the oncoming car on the left, and when there is not enough clearance for both on the road the chances will have to be taken with the ditch on the right.

In my above spoken-of trip I drove sometimes a right and sometimes a left-control car, twice a day 15 miles from the lake shore hotel where I was stopping to the factory in the city, over a narrow brick road just wide enough to pass another car with about 12 inches clearance, the surface of the road on the right of the brick being very deep mud it was not advisable to run into it unless forced to do so by the oncoming driver on the left. The result of this driving situation was that I never felt safe unless I could watch the clearance between the oncoming car and mine, which with the left-side control was always possible to do.

Not all the drivers coming towards us were expert judges of space and twice I was forced into the mud with no further consequences than a slight delay in getting out.

"Watching the ditch" with a right-side control would have certainly meant new left side fenders, hub caps, etc., for our car, and possibly a wrecked car with some one hurt.

In driving the right-side control car over this road it was a matter of guesswork as to how much clearance I had over the other car; it was having to take the chances on both sides.

As to the left-side control in passing another car going in the same way it is not the car being passed that one wishes to watch, but the left side of the road in order to get the chance to cut over to the left when the road is clear of oncoming vehicles, and here the advantage of the left-side control shows up in the driver's ability to see around and to the left of the vehicle ahead which is to be passed.

Of course, if the road is wide enough for three or four cars abreast, the position of the driver is not so important, but it is the close places where fine steering has to be done and accurate driving is necessary that the left-side control shows to its best advantage.

Of course, the factory's side of the situation is mostly governed by the thousands of dollars it will cost them to change their right-hand existing designs to left-side control.

The problem that the foreign sales organization has to cope with in marketing left-side control cars abroad will probably never be solved until some day when international conferences decide on some uniform code of road usage which will result in one world-wide custom of driving.

Charleston, S. C. M. B. PAINE.

Is Disgusted with Left Drive

Editor THE AUTOMOBILE:—I notice the discussion of the left vs. right-hand drive in your columns, and as I am pretty thoroughly disgusted with the left drive (I am using left drive now) after using the right drive, I wish to show through your columns just why the left drive is wrong. It is so clearly wrong that I am at a loss to understand how any manufacturer of cars in America could ever be induced to build cars with driver's position on the left.

Taking up the various reasons advanced, point by point, let us first consider:

(1) Cars approaching from opposite directions. With left-hand drive, the driver has no view whatever of the right side of the road, the ditch, gutter or curb that may be there. The real danger, especially on narrow roads or streets, lurks at his right—never in the car approaching, for the driver of the approaching car is also on the lookout to avoid collision. Now, if each car is right-hand drive, the drivers can see the right-hand side of the road, and also can see each other, for they are on the same level approximately. The right drive is the only drive that will permit the drivers to see the sides of a narrow road and the approaching car. As for estimating the distance between the cars in passing, ask any driver accustomed to a right-hand car if he ever has any trouble in this respect. This estimation I find to be almost instinctive, as, I am sure, do all drivers.

(2) Cars passing in the same direction. There the consideration by the man passing another car must be for the other car. Ethics demand it, if nothing else, and here again the right-hand drive triumphs. You leave the car you are passing on the right, but as the driver of your car is also on the right you are sure never to scrape your neighbor's car, even though he is facing away from you and not in position to look out for himself as he is when meeting you. Some good friend may

come back and ask what about the curb in this instance so I give the answer now: It is a chance you must take. I said above that the consideration by the overtaking car must be for the overtaken car not for himself.

(3) Cars stopping at right side of street. Right-hand drive, with center control on the order of that in the Owen or Reo 5th, I think it is—anyway the cam handle shifting lever can be so designed, as can also the relation between the steering wheel and front seat, that entering the front seats from the right side is perfectly easy, and it should be done. And with the right-hand drive, the driver, who is often the host, takes his place after his guests are seated. The left-hand drive forces the host to take his seat first, which is a violation of hospitality.

(4) Right or left-hand operation of control lever. This makes no difference whatever, as I know from experience that the normal person is ambidextrous in this respect, and the left hand, after a little practice, is every whit as quick and as accurate as the right.

(5) As for all the other questions, such as torque reaction from the motor, etc., etc., in my opinion the car could better afford to be re-designed throughout, the motor made to reverse its direction if necessary and all other essential changes made to retain the right-hand drive.

Here is one man, and he has talked to many others like himself, who has registered his promise that, should he ever buy another car it will be a right-hand drive, even if it has to come from abroad, in the event all the American makers come to the left-hand drive.

Montgomery, Ala. C. L. JOHNSON.

Has Trouble Meshing Gears

Editor THE AUTOMOBILE:—I am having a little trouble in properly meshing the gears on my car. The trouble is really in two directions, first that while the car is stationary I sometimes can move the gear shifter lever into the required notch and at other times I cannot. I have four speeds and am often compelled to start on a second instead of first. My other trouble is in dropping back to a lower speed in climbing a hill. I cannot get the lower gear into mesh without making considerable noise. Could you help me out through the Letters Department of THE AUTOMOBILE?

Suffern, N. Y. CHARLES PEAT.

—The difficulty you have in meshing the gears while the car is not in motion will be readily cured if you will let the clutch in with the gear lever in neutral for just an instant and then try to mesh the gears again. The reason that the gears do not mesh is that they are not properly aligned for the moment. If the gears do not mesh after the first attempt repeat the process until they do. In dropping from high to a lower speed on a hill you will find that your gears will mesh without much rattle if you will make the change by a quick firm motion the instant the clutch is disengaged.

Motor Skips When Starting

Editor THE AUTOMOBILE:—I have a 1911 model T Ford and have driven it barely 5,000 miles. Outside of the trouble i will mention the car has run to perfection al the time and I have never had a minute's trouble with it in any way. I think that I understand the car very well, as I have had one of the same make before, as well as four others of different makes.

For the last month or so nearly every time the machine is cranked it will run on one, two or three cylinders for from one to three or four minutes. It generally hits on one or two cylinders for that length of time and finally catches all four and runs perfectly. It will do this no matter whether the motor has been stopped two minutes or over night. When this missing occurs there are none of the vibrators working except on the cylinders that are working. This would seem to show that the trouble lies either in the magneto, vibrators or timers. I have cleaned out the times in good shape, but get no better results; also have taken off the magneto posts and found a little waste under the spring. I removed this, but it did not remedy the trouble. I adjusted and filed off the vibrators to no avail. The vibrators are kept as loose as possible as that is the way they have to be. The coil on this car is a Heintz. Could you tell how to find the source of the trouble?

Van Wert, O. A. READER.

—The fact that the motor starts to fire on all cylinders as soon as it has been running for a few minutes precludes the idea that there is anything wrong with the magneto, vibrators or timers, as you suppose. There are four causes which may be responsible for this trouble; they are as follows: Dirty spark-plugs, electrodes too far apart, too rich a mixture at low speeds and too lean a mixture at low speeds.

In getting at the trouble first take out the spark-plugs and clean them well with gasoline. Be sure that the electrodes are bright and clean before putting the plugs back into the cylinder. After you have done this start the car and see if the trouble still continues; if it does, take the plugs out again and examine the gaps between the points. It is not true that the gap at the plugs should be the widest possible that the current can jump, for two reasons. The first is that the jump made by the current can not be as great in the cylinder where the gases are under pressure and the second is that the spark will not be as hot when the jump is extreme because it will be thinned out to a considerable extent. The gap should not be any greater than 1-32 inch at the most and a shade less than this will give even better results. After bending any points together that may be too far apart, again try the car and see if it works satisfactorily. If it does not it is then time to blame it on the carbureter and not before.

When changing the carbureter adjustment be very sure that you have carefully noted the adjustments as they stand before starting to make any changes or else you will be apt to find yourself in more trouble when you finish than at the start. If the carbureter you are using has two adjustment points for the gasoline, that is a low speed and a high speed screw, make the adjustments on the low speed point first by starting the motor and then turning the nut to produce a slightly leaner mixture. After you have made the mixture slightly leaner at low speeds, speed up the motor and see if it is necessary to change the high speed adjustment. If it is, make the required change to make the motor run as smoothly as it will possibly run. Now take the car out on the road and see if the trouble still occurs. If it does, the remedy will lie in making the adjustments necessary to produce a richer mixture at low speeds.

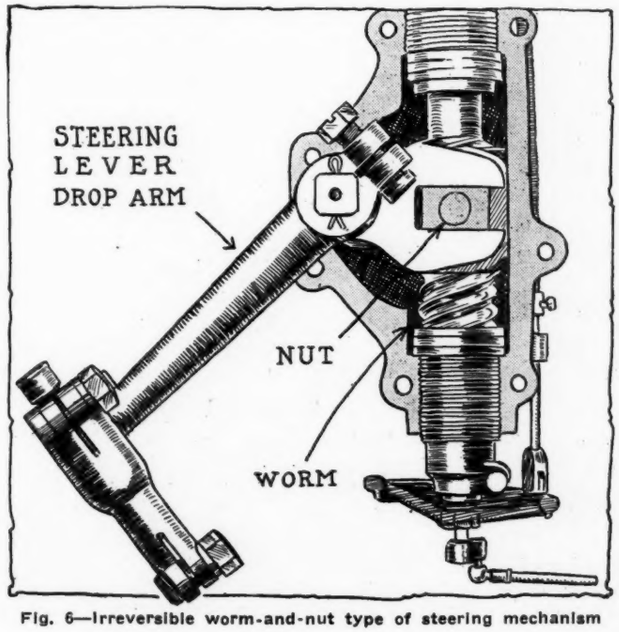


Fig. 6—Irreversible worm-and-nut type of steering mechanism

Fig. 1—A wheel that fell a victim to a slippery New York street

Accidents in the City

Careless Driving Not Responsible for All the Accidents Although a Large Number Are Due to This Cause

Neglect in Using Non-Skid Devices Places Many Cars at the Mercy of a Slippery Street

THE recent agitation among the insurance companies regarding the great increase in automobile accidents within the last few years and the marked intention of some of the accident insurance men to increase their rates has led the more careful owners and drivers to inquire what the causes of these accidents are. It is only natural to expect that the majority of these mishaps take place in the city where there are more cars and this is found to be actually the case. According to the insurance experts the greater part of the accidents are not due to carelessness, but nevertheless there are a great many which are directly traceable to this and no other cause.

One of the most prolific causes of accidents in city streets is skidding. Not less than 80 per cent. of the skids encountered are not at all due to negligence on the part of the driver. An accident which may happen to any one occurs when the car comes upon a freshly sprinkled stretch of asphalt and is compelled by traffic exigencies to make a quick stop. When the brakes are set hard on an occasion of this kind, the car is sure to start sliding because the back wheels are locked. If the frictional grip of the tires on the wet surface of the road is sufficient to check this slip before it becomes dangerous, there is no danger to be feared. Where the skid is not checked, however, the car is entirely out of the driver's control, unless by a mere chance he may again apply the power and secure sufficient traction to get the car again under command. Where the skid is not prevented, an accident is extremely probable if the traffic is dense. An accident of this kind is infrequent when the relative number of the cars in use in the streets of a city like New York is considered, still it is sufficiently frequent to make a considerable number when taken in the aggregate.

Accidents on Slippery Streets

An accident of this kind occurred recently to a large Fiat car passing through a prominent New York street. In this instance the street had been rendered wet by a short shower which only lasted for a few moments. The driver of the automobile did not deem the street slippery enough to take the precaution of placing chains upon the tires and shortly afterwards ended by finding his car in the unfortunate position depicted in Figs. 1 and 2. The car started to skid and being in a position near the curb the rear wheels brought up against the side of the gutter and the result was the bad break shown in the two illustrations just mentioned. A new wheel had to be bought for the car just because the trouble was not taken to apply the non-skids.

The chief objection to asphalt as a pavement is its slipperiness at the slightest moisture. The dust which settles on the surface of the asphalt combines with the water to make a thin layer of paste which acts in about the same manner as a slippery grade of axle grease would do should it be spread upon the surface of the road. It is a fact that a little moisture on the asphalt road will make it more slippery than would be the case with a heavy rain. This is due to the fact that when the rain becomes sufficiently heavy it washes the mud off the surface of the road and takes away the slippery mixture which is so apt to cause a skid at the slightest semblance of locking the wheels. The advice which is often handed out by people who are in a position of knowing to "put the chains on at once," is no airy persiflage. The uncomfortable feeling of sitting in a car that has passed beyond the driver's control and is swinging about end for end, has only to be felt once to convince any one of the advisability of taking the little extra trouble necessary in putting on the tire chains. If any definite proof of what experienced owners of large numbers of city-going vehicles think of the advisability of guarding against the fatal skid, it is only necessary to ask the managers of the large taxicab concerns. The positive instructions issued by these people to their drivers leave no room for further doubt.

Collision on account of the ignorance of traffic regulations also sends many cars to the repair shops and passengers to the hospital. There is only one piece of advice necessary in this connection and that is to secure a booklet from the municipality and study it. You will then know what you are expected to do and just what you can expect of the other driver. These booklets are gotten up by cities for the special purpose of instructing the driver of a car what to do in the crowded city streets. They are not only words of advice, they are words of law. Ignorance of the law is no defense of its infraction and will not keep an offender out of jail or free from the imposition of a fine. The traffic policeman is an excellent institution, but entire confidence cannot be placed in him unless every driver understands his signals and whistles.

Carelessness Causes Collisions

An Abbott car that only escaped many broken parts because of exceptionally strong construction at the strained point is shown in Fig. 3. This was the result of a city accident, in one of our Western towns. An attempt was made to cut

Fig, 2—Flat skidded into gutter because of no non-skid device

across the rear of a car when the inevitable car going in the opposite direction caught the forward part of the automobile and reduced it to the state shown in the illustration. Accidents of this kind are frequent and are really caused by careless driving, for there is no excuse for a driver not exercising every possible care at a street-car crossing. Many drivers have the very pronounced fault of speeding through cross streets between avenues and then when they reach the avenue taking a chance without slowing down. As a rule, the driver on an avenue or a boulevard expects the driver on the side street to enter carefully and it is up to him to do so, for the driver going on the avenue has the right of way over the driver on a side street. This carelessness in entering the avenue causes so many accidents that it is not far behind skidding for effectiveness in this direction.

Caution Will Avert Trouble

When approaching an avenue slow down to almost a stop if the avenue is much traveled. If you intend to turn into the avenue the hand should be extended to signal a possible driver behind that a turn is to be made. This will prevent him from coming alongside unawares and cutting into your car by going straight ahead just as you are making the turn. If the turn is to be made to the left the car should be driven straight across the road past the central intersecting point of the street and the avenue and the turn made beyond this point. If the turn is to be made to the right it should be made close to the curb so as to allow a vehicle coming straight down the avenue to pass.

Another way to prevent accidents in crowded driving is to always sound the warning signal when passing a car. A driver will often make a sudden swerve to avoid the deep holes which are frequently found even in the most traveled of the city streets. Should another car be in the act of passing as this swerve is made by a driver who does not know that there is a car on his left, an accident having serious consequences to the running gear of either or both cars may ensue.

Accidents are even possible when the car is left standing. Should the car be left on a hill without the emergency-brake lever set as it ought to be, it is apt to gather momentum and become a source of danger to other cars as well as itself.

Fig. 3—The results of a collision due to careless city driving

The condition in which the brakes of a car are kept is a factor that must be considered. A car which cannot be stopped quickly is a menace to the public. Most states require that a car should have adequate braking facilities, but it is not a law that can be enforced, as it is impracticable to hold a brake test on every vehicle at short intervals. This should be a matter for the car owner to take care of, not for the sake of others alone, as his own safety depends on the care expended on this part of the car to a marked extent. Rear end collisions due to the fact that the car behind cannot be brought to a standstill quickly enough are the cause of many punctured radiators and broken gasoline tanks. Vigilance, regarding both vehicles and pedestrians, is a necessity in city work.

Harking Back a Decade in the Automobile World

Some of the Events and Activities Which Distinguished the Industry 10 Years Ago as Recorded By THE AUTOMOBILE AND MOTOR REVIEW

FROM *The Automobile and Motor Review*, August 30, 1902:

The heavier class of commercial vehicles, comprehended under the general term lorry, a word comparatively unknown in this country, has already reached a high degree of perfection in Great Britain, particularly the steam lorry.

The Cannon steam racer; the 40-horsepower Mercedes-Simplex and the 35-horsepower Darracq were the features of the entry list at the Brighton Beach race meeting last week. The Cannon machine was barred at the last minute because the driver does not control the engine but it made a few exhibition miles. In one of these trials it cut the mile record for steamers to 1:07 3-5. The car uses 400 pounds of steam pressure. The Mercedes-Simplex carried off the gasoline honors winning the open 10-mile event in 11:54 4-5.

Rules for the Automobile Club of America reliability run to Boston and return have been published. These rules provide for gasoline, steam and electric entries and for three and four-wheeled vehicles. Every contesting car shall carry an official observer who shall be furnished by the club. While any necessary repairs may be made after reaching night controls, the practice of shipping skilled mechanics to control points by train so that new engines may be installed in contesting cars is forbidden.

The necessity of adapting the ratio of gear transmission to the resistance encountered, inherent in all vehicles with explosion motors, is usually met in practice by providing from two to four pairs of gears of graduated sizes, adjacent to each other on parallel shafts, by means of which the first shaft, when run at any given speed, may communicate from two to four different speeds to the second shaft. For the purpose of reversing, an intermediate pinion is arranged in one or another way to mesh between two gears on the first and second shafts, or sometimes a sprocket chain is employed instead.

The race meet last Saturday at Brighton Beach must be classed as a failure. The entry list included only a couple of foreign racers, a couple of American road cars and a few skeleton freaks. The attendance was moderate but the program was drawn out to an intolerable length and continued almost to dark.—Editorial.

W. H. Russell, a New York chemist, claims to have discovered a hydrocarbon gas that will prove a substitute for gasoline in automobile operation. Mr. Russell says that his gas is non-explosive except under compression through electric spark. The gas is generated while the automobile is in motion and is stored in an 8-pound tank.

Exports from New York covering automobiles and parts for the week ending last Saturday amounted to $16,300.

Repair Shop Time System

Two Types of Card Used to Control the Operative Efficiency of the Men During Working Hours

Checking Methods Are Open to Improvement and the Trend Is Toward Simplicity

UTMOST simplicity is the condition which makes a system a success. As the idea with which a business man introduces a more or less detailed control system in his establishment is to reach a condition where he may eliminate useless or harmful factors and supplant them by useful ones and raise things to a high plane of efficiency by a small number of essential operations, it is clear that an excess of details must be guarded against lest they counteract their purpose.

Labor records must be made out, if possible, by the workmen themselves, and it is a matter of course that this part of their occupation should take them as little as possible away from the work for which they are engaged. As much of the necessary writing as can be should be done at one time, to reduce the number and thereby the extent of interruptions of work. If a man records his time when starting and stopping his day's work, when going out at noon and returning to the shop, and when beginning and finishing overtime work; when he also records the time at which a certain repair is begun and ended, he furnishes the office with enough data upon which conclusions and improvements may be based. It is all very well to try and know everything about one's business, but after all that is not the final end of one's being there. An office and its work is always but an adjunct to a factory or shop.

The system for recording the time spent by the workmen in the shop and on individual jobs comprises two forms, one of which is a clock card and the other a so-called job-time card. Both of these cards are originally marked by the office with the names of the workmen using them and after the cards are filled out completely their records are checked by a foreman and a clerk before being sent to the bookkeeper's department for calculating the wages due to the men.

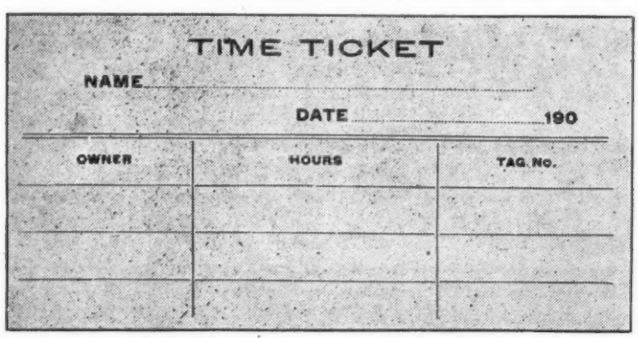
The starts and stops of work are recorded, in most shops, by means of the International type of time clock which stamps the time of ringing in or out on a card suitably lined and cut for this purpose. The time card has ordinarily six columns, of which only one may be stamped at a time. The proper column is brought to register with the stamp inside the clock by the movement of an indicator into one of six notches on the front of the clock, whereby the frame in which the time-card is placed is put into the correct position.

One of the most widely used designs of a time-card is Form 5, which is tan-colored and 5 1-2 by 3 1-2 inches. It is printed with the name of the White Company, 631 West Fifty-seventh street, New York City, and spaces are provided for filling in the name of the workman, whose time is recorded on this card and the week during which the latter is used. In addition thereto the shop number of the worker is entered on the card. There are six stamping spaces in each line and seven lines are provided, one for each day of the week. The spaces are designed to be filled when the workman arrives in the morning, goes out for and returns from lunch, and leaves in the evening; start and stop of overtime work are specifically entered on the card. Besides these six columns there is a blank space in every line, in which the total working time of the day is entered. At the close of the week these totals are footed and the sum recorded at the bottom of the car, and when the workman is paid he signs the card as a receipt for his wages which are based on the times given by his clock card. Slight variations in the design of the clock card are found with various companies. Some companies mark the six columns Morning in and out, Afternoon in and out, Overtime in and out; others provide a space for the rate at which the worker's time and overtime are paid; still others print rules or regulations on their cards, for instance: "Each man his own timekeeper. We pay by this record, your own recording," etc. However, the same principal features appear on almost all the cards, so that they are stamped in the same manner.

Several Types of Clock Cards

A special type of time-clock card used by the Peerless Company, of New York, is here shown as Form 10. This is a white card, 4 by 5 1-2 inches, printed on one side only, on which the name of the workman, the week during which the card is used, and his rate of payment are entered. The other records are "in and out" times printed by a time clock in the morning and evening, at lunch and when a man works overtime. There is a series of stamping spaces along every side of the card. Every morning the total number of working hours of the man during the previous day is calculated and the amount due to him for his work is entered on the card. When he receives his wages he is made to sign the card, which is preserved and filed for future reference.

Very much more variation is found in the forms, however, on which the distribution of the men's time is recorded. One blank, Form 6, is very similar to Form 5, it being also a clock card, and of the same size as Form 5. It is used by the Studebaker Brothers Company, of New York, 140 West Fifty-second street, to record the time spend by each man on every particular job on which he works. This card is made out in addition to the ordinary clock card. Form 6 is green where work is done on jobs which are paid in cash, while charge jobs are recorded on white blanks. The idea of morning, afternoon and overtime has been carried out also in the design of this blank although the spaces are marked differently. At the same time the design of Form 6 permits of repeated, though uneconomical,

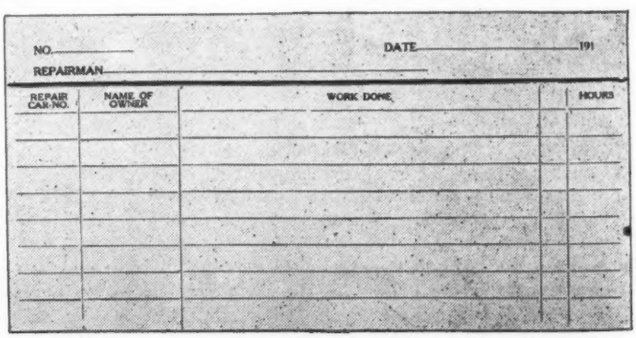

TIME TICKET

NAME.....

DATE.....190

OWNER	HOURS	TAG. No.

Form 1—Haynes Company's job-time blank; thin white paper with black printing; comes in pads, 4 1-4 by 4 3-4 inches, which are kept on the foreman's desk

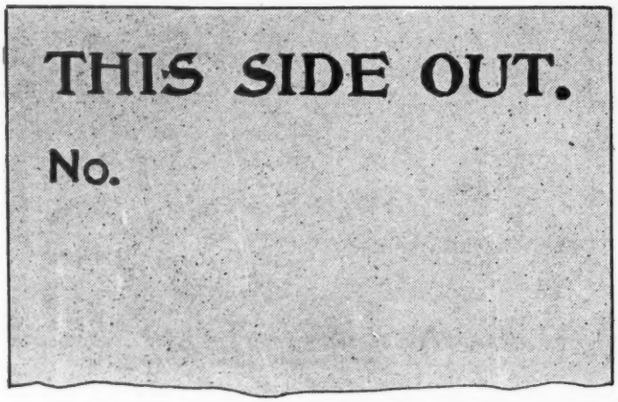

NO.....

DATE.....191

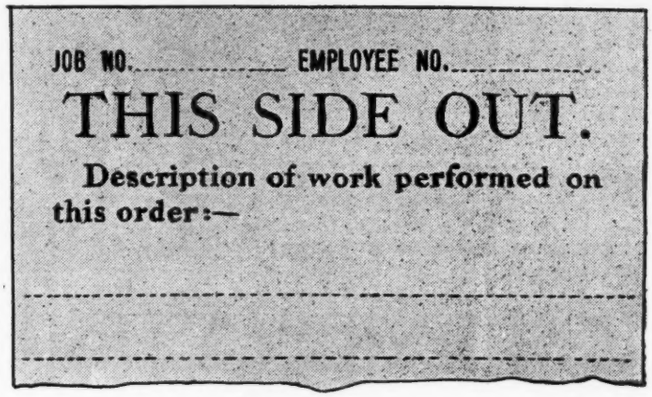
REPAIRMAN.....

REPAIR CAR NO.	NAME OF OWNER	WORK DONE	HOURS

Form 2—Job-time card used in the White Company's service department; thin white cardboard printed in black; comes loose; size 6 1-4 by 4 inches



Form 3—White company's time-clock card, reverse side; is of tan cardboard printed in black and marked with name and number of workman



Form 4—Reverse side of time-clock card used by Studebaker service department; green with black printing; used for individual cash jobs

interruptions of one job without confusion of the records. As this card is used only for a specific job, the job or order number assigned to the work when the car is taken over by the superintendent of the Studebaker repair department is marked on this card when it is first started. After the repair, so far as one man is engaged in it, is completed, the card is filed away and the total times for each day are figured as in the case of Form 5.

Job Time-Cards in Many Designs

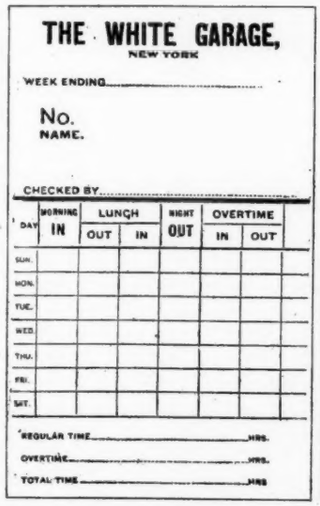
To avoid any trouble arising from mutual inspection of the workmen's time-cards, the men file their cards in a suitable frame when they go out, but turn the stamping side against the wall. The reverse of Form 5 is Form 3, and the reverse of Form 6 is Form 4. The green card being used in connection with but one job, it is filled out with every item of the repair work as the latter proceeds. On Form 3 as well as on Form 4 the name of the workman to whom the card is assigned is written, so that a glance over the rack in which the time-cards are kept shows the shop foreman or inspector which men are out and which are in.

Besides the job clock-card, other forms are in use on which the time taken by each job and by every step of the same is entered. If, for instance, a car is brought into the shop to have its valves ground, the carbureter adjusted, the brakes relined and lost motion taken up in the steering gear, these items are entered on the job time-card, as shown in Form 2, which is used by the White company. This form provides space for entering the number of the job which it is given when first taken over by the repair department, the date when this is done, the number of the car and the name of its owner, the progressive steps of the work and the time taken by each. As the work proceeds the time taken by every stage of the repair is entered and when the work is finished is checked by the head repairman, who is in a position to supervise the work and prevent excessive charges of the men.

Form 1 is a similar design and used by the service department of the Haynes Automobile Company, 250 West Fifty-fourth street, New York City. This Form 1 is marked with the name of the workman and the date of the week, as well as the name of the car owner, the number of the tag with which his car is sent into the shop and is filled with the hours spent on his car. The details of the work are given in the daily time distribution card of the man, Form 12, which is described below in detail.

Another system of recording time distribution in the shop is used by the American-Marion Sales Company, Broadway and Sixty-third street, New York City. This company uses a time sheet, Form 7, which is made out when a car is sent into the repair shop, and is then marked with the date on which this is done. The job number is also marked upon the form, but the name of the owner is omitted. On the other hand, this form provides a column for the names of one or more workmen who were engaged in the repair of the car and for elaboration of their labor thereon. The hours and minutes spent by each on each job are also entered on the form which, when the work is ready to be delivered to the customer, is checked over by the machinist for technical inspection and by the foreman for correctness of the men's time. Then the total time expended on the car is figured, and the sheet is forwarded to the bookkeeper's department.

An apparently similar card is used in the shop of the Peerless Motor Car Company, 1758 Broadway, New York City; this card, Form 12, is filled out by every workman in addition to his time-card. On Form 9 he enters whatever work he does during the day and on which order or job it should be charged; the time of starting and stopping every job is printed on the card by a special time stamp in the following manner: A number of widely spaced lines are used for entering the various jobs on them; these lines are intersected by downward lines marking the columns on the card, and in the last column a short line drawn from left to right is inserted between every two lines, giving two spaces for every job. In the upper space the starting time is stamped, while the lower space is reserved for the stopping time. The bookkeeper's department then calculates how much time of a man's work was spent during the regular working day and how much is to be figured as overtime. Ordinarily each man uses one card a day, but if he works on a large number of jobs, two or more cards are given to him, all of which are turned over to the foreman in the evening. The


THE WHITE GARAGE,
NEW YORK

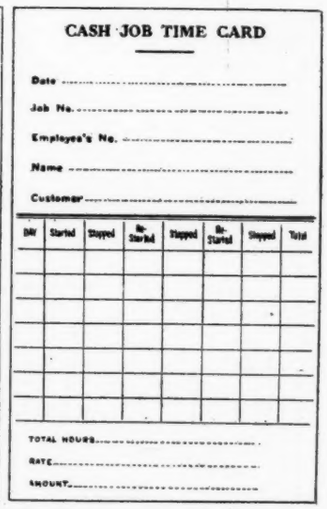
WEEK ENDING

No.
NAME.

CHECKED BY

DAY	MORNING IN	LUNCH OUT	LUNCH IN	NIGHT OUT	OVERTIME IN	OVERTIME OUT
SUN.						
MON.						
TUE.						
WED.						
THU.						
FRI.						
SAT.						

REGULAR TIME ..... HRS.
OVERTIME ..... HRS.
TOTAL TIME ..... HRS

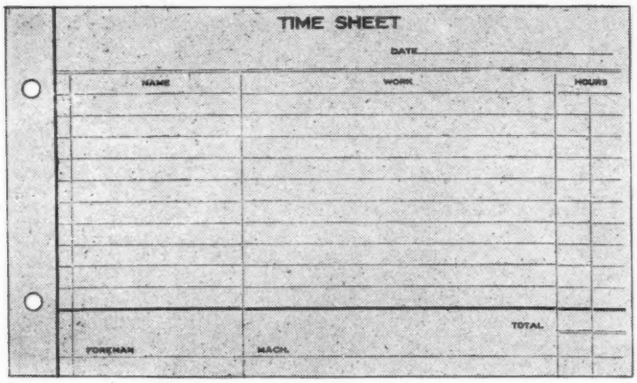

CASH JOB TIME CARD

Date
Job No.
Employee's No.
Name
Customer

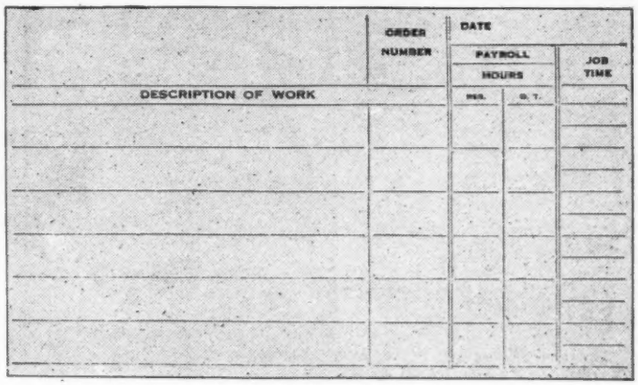
DAY	Started	Stopped	Re-Started	Stopped	Re-Started	Stopped	Total

TOTAL HOURS
RATE
AMOUNT

Form 5—White company's clock time-card, 3 1-2 by 5 1-2 inches; tan with black printing. Form 6—Studebaker's cash job time-card, same size as Form 5; green



Form 7—Job-time blank of American-Marion Sales Company; white, thin paper, black printing; 8 by 4 3-4 inches; kept by foreman who gives it to workman



Form 9—Peerless company's job-time card; tan cardboard with black printing; 5 1-2 by 3 1-4 inches; start and finishing time of every operation are stamped on this card

total job times as accounted for by these cards must, of course, correspond to the main time record of a man's clock card.

The Haynes Company's time distribution card is Form 12. It is 4 by 8 inches in size and printed red on one side and black on the other. Both sides are marked with the date on which the card is used, the name of the workman using it and his shop number. The black side, which is used before noon, has twenty-five lines, one for every quarter-of-an-hour between 6 and 12 a. m.; the red reverse side has the same number of lines printed at intervals from 1 to 6 p. m., and a space for remarks is left on the bottom of this side of the card. Whenever a job is started it is written on the line corresponding most closely to the time of the start. The order number of the car, on which the repair work is done, is also recorded, as is the rate of payment of the workman. All time-cards are sent to the bookkeeper every night, who distributes the men's time on the customer's charge accounts.

SMITH MOTOR CAR CO.
NEW YORK

Week ending.....

Employee..... No.....

DAY	Morning	Lunch		Night	Overtime		Reg. Total	Over Total
	IN	OUT	IN	OUT	IN	OUT		
S								
M								
T								
W								
T								
F								
S								

Clerk O. K. here.....

Regular.....hours; $.....

Overtime.....hours; $.....

Received full payment.....

Stamp Date of Payment Here

Form 8—Proposed time-clock card shown in full size; black printing on bluish-white paper, goes to office daily to have wages figured on it, being kept on rack during daytime

As reference to the captions of the various blanks indicates, there are practically no two forms of the same size, except the clock cards, which are made for its customers by the leading time-clock manufacturer. The disadvantage of having half a dozen forms in a system and each of a different size must be obvious to every office worker, and it is the office workers who have to do principally with the handling of the shop records. Therefore, as many cards, sheets and other blanks as possible should be made in the same size.

Following this idea, a time-recording system is outlined below which like most of the others comprises two cards, in which all the features found in the various designs shown above are contained. The system uses two cards, one of which is the weekly time card, while the other is a daily workman's card, on which every job, or rather, operation he does is entered with a fair measure of detail. The clock card is of the standard size, while the job-time is of the same width, but twice as long as the clock card, and is folded around its middle line.

Improved Form for Clock-Card

The clock-card, which is based on the conventional type, but includes a few additional points of information, is illustrated as Form 8. On its head the name of the company appears, thereunder the date on which the week ends, during which the card is to be used. The name of the employee and his shop number follows, and a space is left under this line, in which a short rule or statement of the company may be printed. Besides the six stamping columns which are marked the same way as in Form 5 two columns are provided in which the totals of regular and overtime for each day are figured either at the end of the week or every morning, when the cards are turned over to the office of the company's bookkeeper. These totals in turn are footed, regular and overtime hours, the amount which is paid to the workman for them is calculated and then entered on the card. The sum of both amounts is paid to the workman at the end of the week, and he is made to receipt on the card, which is then filed by the bookkeeper's clerk. On the same day the card is stamped in the lower right-hand corner. All workmen's cards for one week are made into a package and stored away for future reference.

The second card, Form 11, as has been stated before, is 3 1-2 by 11 inches and folds around its middle line so that, when folded, it is as large as Form 8. The Men's Job Time Card, Form 11, like the clock card, gives the name of the employee and his

number, the date on which the card is used and the number of regular and overtime hours which the man worked during the day. The caption of the card appears in large letters, so as to avoid confusion with the clock-card blanks, although this may be easily prevented by using different colors for the two forms. Under the caption it is a good thing to print a rule calling the workman's attention to the fact that his prompt and correct payment depends upon his truthful filling out of the blank, and the more personally the note is worded the more effective should it prove, as such a phrasing compensates for the severity of the order itself.

Proposed Blank for Job Time

Five columns ruled on the front side of the card below the caption of the card, and over the entire reverse side of the blank, offer the opportunity of recording every important detail of a repair, so far as the time consumed by it is concerned. Each of these columns is crowned by a head, which runs as follows: Stamp here, Job No., Description of Your Operations, Hours, and a check mark. For the stamping of this card the ordinary, large time-clock cannot be used, but a smaller type of time-stamp may be applied to advantage. This type of clock may be bought with a stamping mechanism giving the time as it changes from minute to minute; the stamping mechanism is ordinarily located just above the clock proper and is actuated by pressing down a handle. A clock which gives a one or two-line record like the following

Aug. 15-12
3:35 p. m.

is about the most suitable for the purpose wanted. Every time a man starts on a job or finishes it he stamps the card. After stamping for the start, he enters on the card the job number of the car on which he is put to work, and the specific work which he is made to do. When he finishes a job he stamps the time in the first column as closely to the descriptive text as possible, so that the card offers positively more space than will be required by any one worker in a day's time. This insures simplicity of the system and means that every man must provide a main clock card for the week and six daily cards, all of which make one compact little package.

On the following morning the foreman goes over the cards of the day, enters the time each operation took on the card and checks it if it is correct. Then the form is held on a rack on his desk and at the end of the week is sent to the office together with the main clock card.

The wages of each man are figured by the bookkeeper, after which both clock and job-time card are filed away in alphabetical order, each set of clock or job-time cards making a compact package which is always ready for future reference.

SMITH MOTOR CAR CO.
NEW YORK

Employee: Date:
No. Reg. ; Over

Men's Job-Time Card

You must enter every job, its starting and stopping time on this sheet, to be paid correctly.
J. B. Smith, Pres.

Stamp Here	Job No.	Description of Your Operations	Hrs.	✓

These times are correct..... Foreman

Form 11—Proposed design for job-time card; same material and print as Form 8; 3 1-2 by 11 inches and folds around line halfway its length; when finished are kept with clock cards

PEERLESS MOTOR CAR COMPANY of New York

IN OUT IN OUT IN OUT IN OUT IN OUT IN OUT IN OUT
FRI. SAT. SUN. MON. TUES. WED. THUR.
OVERTIME

123

IN	DAY	WEEK ENDING	TOTAL HOURS	DAY	OUT
	FRI.	Frank Snyder		FRI.	
	SAT.			SAT.	
	SUN.			SUN.	
	MON.	Total-Time Hrs.-Rate .50		MON.	
	TUES.	Amount Due		TUES	
	WED.	Rec'd Above		WED.	
	THUR.			THUR.	

NOON TIME
FRI. SAT. SUN. MON. TUES. WED. THUR.
IN OUT IN OUT IN OUT IN OUT IN OUT IN OUT IN OUT

Form 10—Clock card used by Peerless company; medium-thick white cardboard with black printing; 5 1-4 by 4 inches; goes to office every morning for adding working times of past day

A. M.

DAILY TIME CARD

8/10 1912

Workman F. R. Willis No. 15

A. M	Operation	Order No.	Rate
6.00	Adjust carburetor	256	50
6.15			
6.30			
6.45	Take up steering gear	256	
7.00			

6.00

Remarks.....

Form 12—Haynes company's job-time card, white thin cardboard with black printing on one side and red on the other; 4 by 8 inches; gives fairly exact time of every operation.

Labor-Day Tours to Nearby Beauty Spots

Suggestions for Spending the Coming Holidays Amid Nature's Wonders Adjacent to New York City

LABOR Day, which falls this year on September 2, following the week-end holidays, affords another excellent opportunity for automobile touring. For the benefit of automobilists of New York and vicinity and visitors in and about the metropolis, the following series of short tours has been prepared and is suggested to them as a fine way to spend the holiday.

Following is a summary of the various routes:

1. New York to Poughkeepsie—Pittsfield, Mass.—Waterbury, Conn.—New York. This will make a delightful run of 2, 3 or 4 days through the most beautiful sections of Westchester County, the lake district of Putnam County, the Berkshire hills of Massachusetts and Connecticut and the scenic route from Waterbury to New York. Following the usual route to Yonkers and Tarrytown, swing eastward to Briarcliff and Yorktown Heights to Lake Mahopac. From the lake the way is east to Carmel and thence to Luddington, Stormville, Hopewell Church and by a wide swing to Fishkill Plains and New Hackensack to Poughkeepsie. This is rather longer than by the direct route following the Albany Post Road from Yonkers, but the latter highway is undergoing repairs and to avoid detours that might lead the tourist into numerous difficulties, the longer and more picturesque route is recommended. The distance is 87.6 miles and may be easily done in 5 hours. From Poughkeepsie to Pittsfield, Mass., is 85 miles and the route passes Rhinebeck, the Astor country place, Pine Plains, Ancram, Copake, Hillsdale. Shortly after leaving that place there is a stiff climb, but from the summit there is a mountain view that is ranked among the most wonderful in this section. The state road is followed through South Egremont, Great Barrington, Stockbridge, Lenox to Plainfield. Caution for stringent police regulations at Lenox and Stockbridge.

The tourist should be able to make Pittsfield from New York in 1 day's running, although the schedule calls for 172.6 miles. The roads are excellent and the country traversed is beautiful and interesting.

Many Fine Landscapes to Be Seen

The third section of the tour is to Waterbury, retracing the course to Great Barrington, where it turns east through Sheffield, Ashley Falls, Canaan, Norfolk, Torrington; there another series of wonderful landscapes will be unfolded. Thence through East Litchfield, Thomaston and Waterville to Waterbury, a total of 74.9 miles. The run to New York is 88.2 miles via Bridgeport and along the north shore of the sound and about the same through Danbury and south to the Westchester County line, meeting the Boston Post Road or going cross-country to White Plains. By making night stops of Poughkeepsie, Pittsfield and Waterbury, a leisurely 4-day trip is afforded with plenty of time to spare for detours and explorations. If Pittsfield and Waterbury are used as night stops there will be a 3-day tour of many attractions. Those who simply wish the tour for the sake of riding will find that the run to Pittsfield and return in 2 days will give them a satisfactory ride over the course outlined.

2. New York to Newburgh, Port Jervis and New Jersey Hills. Leaving New York, the most picturesque course will be found by following the route given above to Fishkill, crossing the Hudson via ferry to Newburgh, about 80 miles by this longer route. From Newburgh the course lies westwardly to Liberty, 57.7 miles, touching Coldenham, Walden, Pine Bush, Ulsterville, Ellenville and Woodburne. This section contains some good dirt roads, but is largely macadamized. From Liberty to Port Jervis the run is through the Mongaup Valley touching Stevenson and the village of Mongaup. From Port Jervis to New York the way passes through Milford, Pa., to Hainsville, N. J., from there through Culver Lake, Branchville, Newton, Sparta, passes down the Berkshire Valley to Dover and thence to Parsippany and Montclair. From Montclair to New York there are numerous good routes, but perhaps the best is through Rutherford to the Weehawken Ferry.

This tour may be done in 3 or 4 days according to inclination. It is about 250 miles long by the route suggested, but may be shortened 20 miles by following the direct route to Newburgh via the Fort Lee Ferry and the New Jersey and New York route on the west side of the Hudson. If that course is followed to Newburgh it is easily possible to reach Port Jervis in 1 day's run and return through the New Jersey hills the following day. However, the spur of the Blue Ridge which lies to the west of Newburgh may prove attractive for exploration if time is at hand for that purpose and it may be desirable to put in at least a day in covering the distance from Newburgh to Port Jervis. A detour on the return trip will probably attract some tourists. Instead of taking the road to the left at Branchville which leads around the south end of Lake Hopatcong, the right fork passes through Hackettstown and over Schooley Mountain and east through German Village to Morristown.

A Route for High-Powered Cars

Catskill detour from Newburgh, 3. Not recommended for any but high-powered cars. The route from Newburgh may be along the Hudson to Kingston, 34 miles, but it has some bad stretches and is not so agreeable for ordinary touring as if the party takes the route via New Paltz, which is longer. This passes through Plattekill, New Paltz, Eddyville and Wilbur and is about 36.2 miles over good roads. North from Kingston there is a fine macadam road to Saugerties. This is followed by good country road to Evesport, West Camp and Catskill. Leaving Catskill the next section of the run will be found to test even a car of 40 horsepower as it runs through the heart of the Catskill Mountains. This course lies almost due west to Palenville then up into the hills at Haines Falls and Tannersville to Phoenicia. The route traverses the territory where the adventures of Rip Van Winkle were staged. From Phoenicia the return course is via Beechford, just north of the Ashokan reservoir to Woodstock and Saugerties. The course toward Port Jervis is a return over the original road to Kingston and thence southwesterly to Ellenville, where the main route is picked up.

There is an easier route through the Catskills that may be followed by the average automobile without much difficulty. This is identical with the route given to Catskill and then west into the hills via Leeds, Cairo, East Windham, Windham, Prattsville to Grand Gorge, 41.8 miles from Catskill. At Grand Gorge the road turns south passing Roxbury, Arkville, Griffin's Corners, Pine Hill, Shandaken to Phoenicia, thence to Saugerties. From Catskill to Saugerties by this route is 106 miles and will be found to be about the mileage for a full day's running. The whole detour by the long route via Grand Gorge is 200 miles. Thus for a 3-day tour it will probably be well to make the first night stop at Catskill, spending the second day in the hills and the third in returning. If the short route via Palenville is used, the trip need cover only 2 days, although there will be some hard running on the second.

4. South New Jersey. Cross to Staten Island by the Municipal Ferry and run down the east side of the island to New Dorp, thence on the fine main road through Huguenot and Tottenville, crossing to the New Jersey side at Perth Amboy. Cross the Raritan River and continue south through South Amboy, Keyport, Matawan, Marlboro, Freehold, Adelphia to Lakewood.

From Lakewood to Atlantic City the course is via Toms River, Forked River, Waretown, Barnegat, Absecon to the resort city. This is a run of 115.8 miles, all of which is over fine roads. A variation of the above is to continue east from the route given above at Keyport to Long Branch and down the coast road to Point Pleasant, where a cross-road takes the party to Lakewood. This adds about 10 miles to the itinerary, but gives an opportunity to visit Asbury Park and a score of similar resorts.

Leaving Atlantic City for Cape May, the low country necessitates a swing west to Mays Landing and thence south following the coastline to Cape May passing through Tuckahoe, Seaville to Cape May Court House. The resort lies 13 miles to the south. The roads are not so good on this day's trip, but will be found passable at moderate speed. The distance is 63.3 miles. The return trip may be via Philadelphia, in which case the course will be to retrace the road to Cape May Court House, then taking the left branch road touch Goshen, Dennisville, Eldora, Leesburg, Dorchester, Port Elizabeth, Millville, Vineland, Newfield, Malaga, Franklinville, Clayton, Glassboro, Gloucester to Camden. This makes a total of 86.7 miles. Great caution should be used about Cape May Court House in crossing the railroad.

Roads From Camden to New York

From Camden to New York is an easy run over splendid roads via Trenton, and the choice of several routes is given, all of which are familiar to automobilists. The distance is 85 to 102.5 miles, depending upon which route is used. The Staten Island-New Brunswick route is interesting and that via Morristown and Montclair is fine. All told, this tour embraces 355 miles without detours. Including the Long Branch variant and the long way from Philadelphia to New York the total would come to 375 miles. The run from New York to Cape May though Lakewood and Atlantic City can be easily made in a long day's run and the return via Philadelphia affords a distinct change for the course back to the metropolis. If a day is spent in skirting the coast to Atlantic City the itinerary of the trip may be extended to cover 3 days or more.

5. Long Island. A complete circuit of Long Island contemplates starting from the Queensboro Bridge and following the north shore of the island, turning south at Greenport and skirting the south shore to the point of beginning. The course is from Long Island City to Winfield, Corona, Flushing, Bayside, Little Neck, Manhasset, Manhasset Hills, Roslyn, East Norwich to Huntington. In this part of the trip there may be several short detours along the shores of the numerous deep inlets that pierce the north line of Long Island. From Huntington east the main towns and villages are as follows: Centerport, Commack, Smithtown, St. James, Stony Brook, East Setauket, Port Jefferson, Miller's Place, Wading River, Riverhead, Aquebogue, Jamesport, Mattituck, Cutchogue, Southold and Greenport. This gives a distance of 103.9 miles, which undoubtedly will be much amplified and augmented when it comes to actual touring. The country from Huntington east is varied in scenery, but the roads are good on the general average and the temptation to try out a dozen or so of the bypaths north and south of the main route will probably account for a large addition to the contemplated mileage. There are numerous quiet little places where a night stop can be made and no trouble should be encountered in this respect even if no advance provisions are made to care for such a contingency. From Greenport the way lies across Shelter Island Ferry to Shelter Island, where another ferriage brings the party to Sag Harbor. This whole section is the vacation spot for tired dwellers in the metropolitan district and has a large summer population. Turning west after leaving Sag Harbor the route passes through Bridgehamptom, Southampton, East Quogue, Quogue, Westhampton Beach, Eastport, East Moriches, Center Moriches, Moriches, Brookhaven, Bellport, to Patchogue, traversing the lowlands along the shores of Shinnecock, Moriches and Great South Bays. The last leg of the round takes in Blue Point, Bayport, Sayville, West Sayville, East Islip, Islip, Bay Shore, Babylon, New Point, Amityville, Freeport, Baldwin, Rockville Center and Jamaica to Long Island City.

The total distance as outlined is 219 miles, but it may be extended indefinitely to any desired distance.

The five routes suggested are all delightful in different ways. The run into the Berkshires is the easiest as far as grades and general excellence of the roads are concerned. The section covered presents a continuous panorama of beautiful landscapes besides being interesting from the historical viewpoint.

Some Splendid River Views

The run through Newburgh to the Delaware Water Gap, while familiar to many of the automobile public in and about New York, is always a favorite. The big detour into the Catskills has some novel features. In the first place, the river road north of Newburgh, while poor in spots, is worth while covering on account of the gorgeous river views to be had from the car. If the automobile is a big, powerful machine and the tourists wish to enjoy something rather novel in the way of traveling, by all means let them make the trip through Palenville and up into the Catskills by the short route suggested. While not positively dangerous, much care should be used in driving along the mountain trails. The other, more circuitous route is not specially difficult, even for a car of moderate power.

The trip to Cape May is over magnificent roads and some that are not so magnificent. South Jersey is somewhat of a laggard in the matter of good roads, but within the last 2 years great improvements have been made in the main highways. The course through Lakewood to Atlantic City is like a boulevard, as is also the Philadelphia-New York run.

The Long Island tour will depend for its enjoyability upon the desires of the tourists. It can be made a hurried jumble of scenes, none of which will prove satisfactory, and it also may be made quite as delightful as any automobile trip in this part of the world. A prearranged plan of tour on Long Island will probably work more harm than good unless the party has some definite idea as to places for its regular stops. One-day trips can be made easily to and from each of the places named as the terminus of the first section of any of the trips except Long Island, and if a swift ride is what is desired, it is perfectly possible to go to Greenport and return in a day.

Rough outline of the five tours suggested herewith. The numbers 1, 2, 3, 4 and 5 correspond with the designations of the tours in the text of the article

Tours From St. Louis

Several Interesting Trips Offered to Automobile Enthusiasts Who Want to Go Touring Over Labor Day

The Territory Within Reach of St. Louisians Includes Chicago, Indianapolis, Springfield and Kansas City

ST. LOUIS, MO., Aug. 26—Automobilists of the Mound City who desire to take a 2 or 3-day trip over Sunday and Labor Day, have the choice of more than half a dozen routes on which they may spend the holiday to advantage, both enjoying fine scenery and making the acquaintance of some of the most interesting sections of the country.

Among the routes selected as ideal are the following: Tour No. 1, to Keokuk, Ia., 193.1 miles; No. 2, to Springfield, Mo., about 265 miles; No. 3, to Indianapolis, 243.6 miles; No. 4, to Chicago, about 350 miles; No. 5, to Kansas City, 310.5 miles. All the above are one-way mileages only.

Chief in popularity this year should be route No. 1, to Keokuk, Ia., the main attraction at the objective point of the tour being the huge new dam put in by the North American Securities Company, which will soon supply St. Louis with water. Either Hannibal, Mo., or Quincy, Ill., offers excellent attractions as an overnight stop, either going or returning, should it be deemed inadvisable to spend the night in Keokuk. Hannibal, 133.4 miles from St. Louis, will be remembered as the birthplace of Mark Twain. His old house has been transformed into a museum, and the Hannibalites are exceedingly proud of it and of the fact that the foremost humorist of modern times was a fellow townsman of theirs. At Bowling Green is the home of Champ Clark, Speaker of the national House of Representatives.

If there is plenty of time at the disposal of the party the return trip could be made by way of Springfield, Ill., or the trip could be further extended to take in Davenport, Rock Island and Moline. As regards the roads to be encountered on this tour, they range from fair to good, no great length of really bad roads being met with in the entire distance.

Through the Ozark Mountains

Another tour that will provide much in the way of beautiful scenery is that to Springfield, Mo., through the magnificent Ozark Mountains. While the roads traversed on this trip will not be of the best, the travelers will be amply repaid by the succession of charming prospects to be met with while journeying through the mountain country, some of them pronounced by seasoned travelers the equal of any to be found in the world. Interesting side journeys to inspect the Rolla caves, the wonders of Ha Ha Tonka and the Niangua River will add to the enjoyment of the tour, as will an examination of the world-famed lead and zinc mines of the Ozarks. The round trip may be made comfortably in 4 days, and the accommodations to be secured en route will be found adequate, especially at Rolla, which, in the matter of distance, would seem to be the natural stopping place in both directions.

While the roads of lower Illinois, by reason of the prolonged rains and floods of this year, are not at their best, a tour across that section to Indianapolis, *via* Vandalia and Terre Haute, will prove decidedly interesting to the automobilist. The old National Road, which will be followed the entire distance, is usually in very fair shape, and should it be decided to cover the distance in 3 days instead of 4, Terre Haute will prove to be an ideal overnight stop in both directions. It would be quite possible to vary the return trip by a detour through Champaign and Springfield, the distance from Indianapolis to St. Louis by this route being 333.3 miles.

The tour from St. Louis to Chicago, *via* Springfield, Peoria and Ottawa, is a favorite with the motorists of the Mound City. The roads are in such condition that it is quite possible to make the one-way trip in a single day; not a few St. Louisans have turned this trick within the past 2 years. On the route to Springfield the travelers will traverse the coal fields of southern Illinois, mining seemingly having crowded agriculture from the lead as the leading industry of the inhabitants. The entire distance from Springfield to Peoria is over dirt roads, which, except in rainy weather, will be found to furnish excellent going. Of the two main routes between Peoria and Ottawa that *via* Henry and La Salle is selected, the gravel roads which predominate in this section being especially good on this route. From Ottawa to the Windy City a practically level country is encountered the entire way, the entrance into Chicago being by way of Aurora and the West Side park system. The return route could be varied by taking in Bloomington, the road conditions on this route being good except in wet weather. If the trip is to consume 4 days, Peoria will be the natural overnight stop going and Springfield (or Bloomington, if the route variation is decided upon) returning.

This latter trip is a short cut, being 225.8 miles from Chicago, through Bloomington to Springfield. The start is made at Michigan and Jackon avenues, following the latter and passing through Garfield Park to Austin avenue to Forest Park. The route proceeds to Joliet, following the drainage canal. This town is the county seat of Will county and southwest of it there are still some old Indian mounds left. The Forest of Arden, a private park, is one of the most beautiful spots in the state.

Numerous Points of Interest

In Joliet there are also a number of enormous steel furnaces of the Illinois Steel Company, together with the plants of the American Steel & Wire Company and American Refractories Company. Northwest of the city the state penitentiary is located. From Joliet the route passes through Minoka and Morris to Dwight. After leaving Dwight, the tourists enter the richest farming region of Illinois and after a ride of about 20 miles reach Pontiac, whence the route is followed to Chenoa and Lexington, then to Towanda and Bloomington, 149.3 miles from Chicago. The remaining 76.5 miles lie in historical territory. Leaving Bloomington and passing Miller Park, the tracks of the Chicago & Alton Railroad are followed through a rich farming section. About 38.9 miles from Bloomington, tourists enter the town of Lincoln. This town was founded in 1853 and named for Abraham Lincoln and with his consent before he had achieved state or nation-wide fame. Lincoln, himself, drafted the town charter and practiced law there for a number of years. Beside the college and state school for feeble-minded children the town is noteworthy for the large coal mines situated in its neighborhood. Proceeding southward from Lincoln, Elkhart is reached, where the old homestead of Gov. Richard J. Oglesby is still standing. From Elkhart, the route leads to Williamsville and after a further 15 miles to Springfield.

While the country traversed by route No. 5, to Kansas City, is in some sections rather uninteresting, quite a number of St. Louisians are preparing to take the trip over Labor Day. To add interest to the tour the travelers could leave the route here mapped at Florence, rejoining it at Marshall, where another option is offered of going to Independence *via* the northern route, which hugs the Missouri River quite closely in some places, and stopping at Waverly and Lexington en route. For many miles these routes follow the new Missouri cross-state highway, which also constitutes a portion of the projected transcontinental road. Good stretches of macadam are to be found for a score of miles adjacent to St. Louis and Kansas City, but the remainder of the route is mostly over natural dirt roads, which, although generally excellent in dry weather, are almost impassable in some places after prolonged rain. The negotia-

tion of the round trip in 4 days is well within the capabilities of the modern car. Marshall and Columbia would seem to offer the best attractions as overnight stopping places in either direction, assuming that the route variations as here outlined are decided upon.

Return Route From Chicago

Tourists who, after having gone to Chicago, wish to return by way of a detour, should find the trip through Champaign, Ill., and Indianapolis, Ind., very agreeable. The total mileage of this tour is 289.2 miles. The way leads through Washington Park, south on Cottage avenue, and to the right on Michigan avenue, passing through Roseland, Kensington, Riverdale and Dolton. There a poor road about 1 mile in length is encountered, which is followed by macadam road. The latter is followed past the Glenwood Industrial School for dependent boys, 26.1 miles from Chicago. This institution is remarkable and excels most other schools of its kind in the country. Passing through Chicago Heights, 29.8 miles from Jackson and Michigan Boulevards, the route leads through Steger, Beecher, Grant and Momence, along the Illinois Central tracks, to Kankakee. In this city the St. Viateurs College, a Catholic institution, as well as the state insane asylum, are worthy of inspection. Kankakee is equally important as an industrial and railroad center. From here the road leads directly to Champaign, through one of the richest farming sections of the United States and passing through Chebanse, Clifton and Askum. Champaign is 25.6 miles from Kankakee.

The distance from Champaign to Indianapolis is slightly longer, namely, 128.3 miles. The route leads through Urbana, Ill., and Homer over very good roads to Danville, where Lincoln spent many years of his life practicing law. The balcony of the Feldcamp home, whence he delivered a famous oration, is still in evidence, and, like the soldiers' monument, is a preferred point of interest to tourists. The road then proceeds to Covington, where the Wabash river is crossed, the tourists entering the state of Indiana. Here the tourists find materially better roads than on the preceding stretch of the route. About 30 miles farther Crawfordsville is entered, famous for Wabash college and known as the former home of Gen. Lew Wallace. About 8 miles south of Crawfordsville, Garland Dells, known as the Shades or the Yosemite of Indiana, offers a very attractive side trip, full of wild, romantic landscapes. From Crawfordsville a straight road leads through Jamestown, Pittsboro, Brownsburg and past the Motor Speedway into Indianapolis.

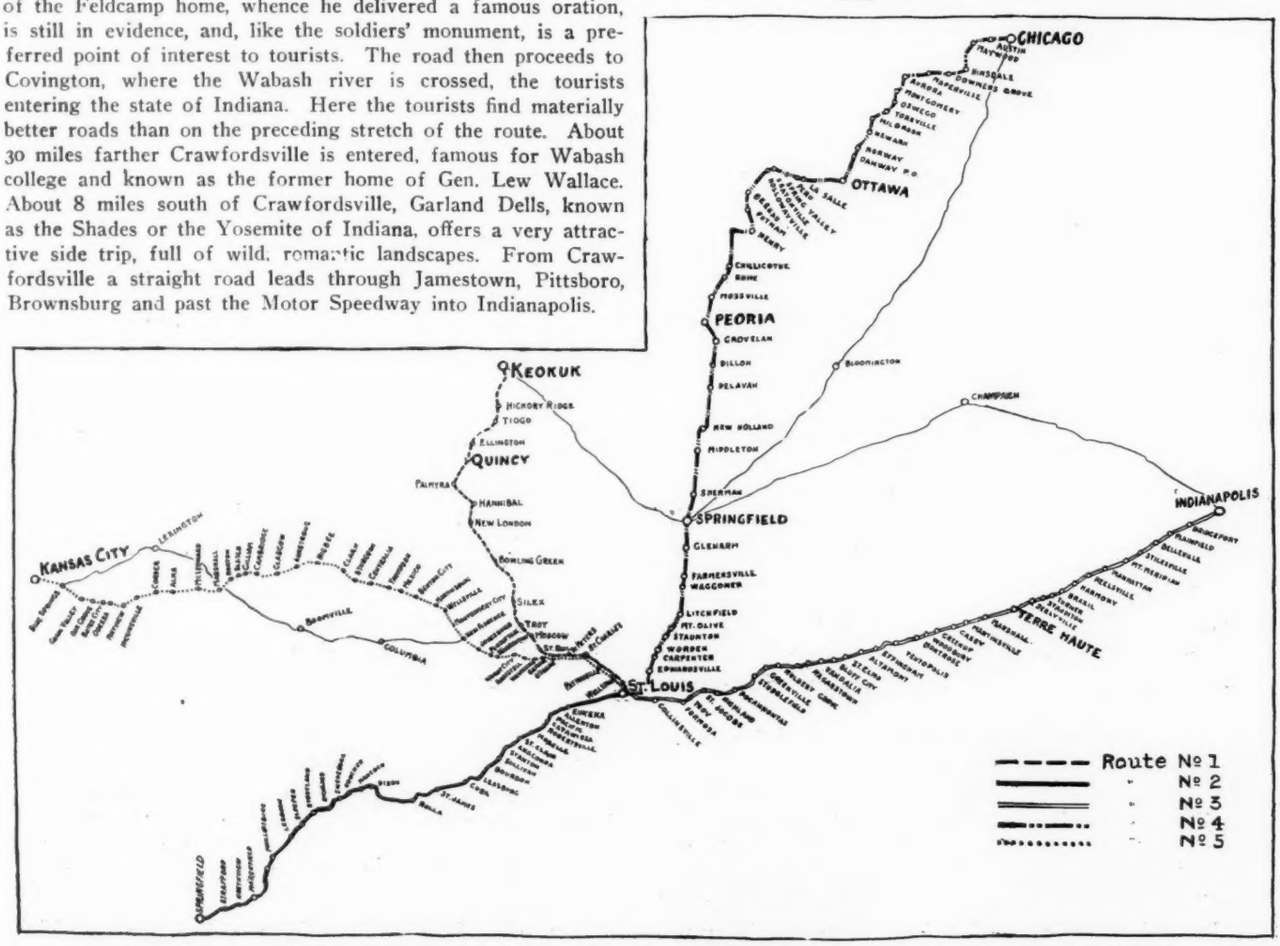
Calendar of Coming Events

Shows, Conventions, Etc.

Aug. 24-Sept. 9	Toronto, Can., Display of Automobiles, etc., at Canadian National Exhibition, Transportation Building.
Sept. 5-15	San Jose, Cal., Automobile Show, San Jose Automobile Dealers' Association.
Sept. 14-21	Chicago, Ill., Annual Fall Festival and Show, Chicago Automobile Trade Association.
Sept. 17-20	Denver, Col., Convention International Association of Fire Engineers.
Sept. 23-Oct. 3	New York City, Rubber Show, Grand Central Palace.
Dec. 7-22	Paris, France, Paris Automobile Show, Grand Palais.
Jan. 4-11	Cleveland, O., Annual Automobile Show.
Jan. 11-25, 1913	New York City, Thirteenth Annual Show, Madison Square Garden and Grand Central Palace, Automobile Board of Trade.
Jan. 20-25	Philadelphia, Pa., Annual Automobile Show.
Jan. 25-Feb. 1	Montreal, Que., Automobile Exhibition, R. M. Jaffray, Manager.
Jan. 27-Feb. 1	Detroit, Mich., Annual Automobile Show.
Feb. 1-8	Chicago, Ill., Annual Automobile Show.
Feb. 10-15	Minneapolis, Minn., Annual Automobile Show.
Feb. 17-22	Kansas City, Kan., Annual Automobile Show.
Feb. 24-March 1	St. Louis, Mo., Annual Automobile Show.
March 3-8	Pittsburgh, Pa., Annual Automobile Show.
March 8-15	Boston, Mass., Annual Automobile Show.
March 17-22	Buffalo, N. Y., Annual Automobile Show.
March 19-23	Boston, Mass., Annual Truck Show.
March 24-29	Indianapolis, Ind., Annual Automobile Show.

Race Meets, Runs, Hill Climbs, Etc.

Aug. 30-31	Elgin, Ill., Road Races, Chicago Automobile Club and Elgin Automobile Road Racing Association.
Sept. 1-2	St. Louis, Mo., Track Races, Universal Exposition Company.
Sept. 2	Indianapolis, Ind., Speedway Meet.
Sept. 2	Winnipeg, Man., Track Meet.
Sept. 3-6	Chicago, Ill., Commercial Vehicle Reliability Run, Chicago Motor Club.
Sept. 11-14	Buffalo, N. Y., Third Annual Reliability Tour, Automobile Club of Buffalo.
Sept. 17	Milwaukee, Wis., Grand Prize Race.
Sept. 20	Milwaukee, Wis., Wisconsin Challenge and Pabst Trophy Races.
Sept. 21	Milwaukee, Wis., Vanderbilt Cup Race.
Sept.	Washington, D. C., Reliability Run, Automobile Club of Washington.
Oct. 7-11	Chicago, Ill., Reliability Run, Chicago Motor Club.
Oct. 12	Salem, N. H., Track Meet, Rockingham Park.
Nov. 6	Shreveport, La., Track Meet, Shreveport Automobile Club.



Map showing the territory surrounding the city of St. Louis, outlining some of the principal routes for short tours

The Automobile

Vol. XXVII Thursday, August 29, 1912 No. 9

THE CLASS JOURNAL COMPANY
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United States and Mexico---------- One Year, $3.00
Other Countries in Postal Union, including Canada---------- One Year, 5.00
To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

Truck Salesmanship

THE salesman capable of selling pleasure automobiles is not by virtue of his salesmanship qualifications in this field necessarily a post-graduate in the sale of motor trucks.

Selling pleasure cars calls for one fund of information; selling motor trucks presupposes an entirely different store of knowledge.

The motor-truck salesman meets the purchasing executive in his business atmosphere. When he discusses buying motor transportation he discusses a department of the business—a department which is to-day attaining greater and greater proportions in the perspective of the various departments of his business. This is so because of the greater despatch demanded by the consumer and because of the retrogression of the horse in that his capacity for work is not so great to-day as it was 10 years ago, due to greater street congestion, greater radius of delivery and differences in street pavements.

A comprehensive knowledge of transportation is the prerequisite of the truck salesman.

To-day the neophytic salesman is often an infant groveling at the feet of the so-called transportation executive of the big business house which is in the market for motor power. True, he knows horsepower, wheelbase, load capacity, tire sizes, exaggerated speeds, estimated cost of upkeep, estimated annual capacity and a score of other estimated factors, but when it comes to talking power transportation he has often failed to lift the veil and survey the broad field of action in which the motor truck is establishing its position in to-day.

Too much effort is being expended by motor truck salesmen on truck mechanics and not enough on pure transportation. This is natural, it is the one subject the salesman would be conversant with and, since it is his rôle to lead the attack on the prospective buyer, it is his duty to select his own munitions of war and handle his campaign as he desires.

The buying executive for the large corporation is rarely a mechanical engineer, and while he may summon to conferences one or a corps of consulting engineers, these engineers are rarely qualified to adequately pass judgment on the truck design because of their general ignorance of this new field of power transportation and the many new factors it involves.

The events of the last 12 months record over a score of examples of where purchasing executives have held such conferences, in fact, series of them, and in the final act have selected the truck with the lowest price in preference to trucks that are to-day considered the best, mechanically considered, in the country. Other examples of this nature but prove conclusively that truck mechanics in a large percentage of the cases is not the keystone of the sale.

It is deplorable to record, yet it is an indisputable fact, that not a few of our biggest industrial concerns, whose judgment is impeachable in their own mercantile buying lines, have selected grossly inferior products in the truck field and have in fact done so in spite of the better judgment or the advice of consulting mechanical engineers in their employ.

Examples of this nature but prove that transportation is the subject to emphasize. Transportation is what the maker must school his selling executives in, it is the one form of attack that is most needed. It is most needed because it contains the strongest, most convincing arguments for motor trucks as compared with animal power.

Transportation is an argument on which many of the so-designated transportation executives of large business houses are amazingly ignorant. Recent researches have shown that few concerns know exactly what animal transportation costs. When pinned down in argument to actual facts and requested to show books revealing costs extending over long periods, they are unable to do so.

There has been more activity in securing horse costs within the last year than there was in the 10 previous years.

So deplorable have animal transportation systems been with many mercantile houses that they refused to have the transportation facilities incorporated in the business of the company, but organized a subsidiary company to handle the transportation and placed a shipping executive in charge. How could the purchasing executive of such a firm be expected to discuss sanely the relative cost of animal and motor power in trucks? And yet, the unschooled salesman is a mere puppet in the hands of such a transportation braggadoccio.

From over sixty leading cities in America, in which a canvass has been made, comes the almost universal

response that mercantile houses have but the scantiest figures on the cost of horse transportation, and when these figures are analyzed it is generally proven that many items that should be in such calculations have been neglected. If the salesman is not master of the situation he will be forced to acknowledge figures of cost as correct which are far from being so, not due to wilful intent but to neglect and ignorance.

There must be determined standards of cost for transportation in different fields of business. A large electrical concern recently stated that it paid $42 a month for electric current to charge the battery of a small runabout used in one department of the business. A transportation expert called into conferences on the question of substituting electrics for horse vehicles immediately refuted such a claim without having once looked into the details. He was too familiar with costs to have such a statement thrust upon him for a single second. An investigation verified his judgment.

We have standards of money value, banks establish standard rates of interest. The merchant knows he has not to pay 20 per cent., as 6 per cent. may be the standard current rate, but in the transportation field these various necessary standards have not been determined and there are not a few shipping or transportation executives in business houses talking as absurdly on horse costs as the merchant who would claim to get all of the money he wanted at ½ per cent. per annum. This only accentuates the necessity for the establishment of proper standards.

Truck factories must do much to determine these standards; they must direct a country-wide campaign of collecting the necessary information needed to arrive at a determination of such standards. Each individual agent, no matter the state in which he is located, cannot do this, no more than the local bank in a Texas town can determine the money rates to the country. **Factors nation-wide enter into these problems of standards of transportation cost, and the only certain way the truck interests can insure themselves of ready response is by general co-operation through their large organizations as well as by continuous co-operation between makers and their many dealers.**

Wisconsin State Law Supreme

Attorney General Decrees That No Municipality or Community Can Make Automobile Regulations Conflicting Therewith

MILWAUKEE, WIS., Aug. 26—A decision by Attorney General Bancroft of Wisconsin that no city, village, county or other form of government lesser than the state can make any laws or ordinances fixing requirements with regard to the operation of motor vehicles which conflict with the state law, has brought dozens of cities and villages to their senses. The state law, which is declared supreme by the attorney general, fixes the speed of motor cars in cities at 15 miles per hour, and on country roads at 25 miles per hour. The object of the law is to make the speed limits uniform throughout the state. Some cities have made limits of 10 and 12 miles per hour, while Milwaukee county has passed a law making the limit on country roads 20 miles per hour. All of these ordinances are outlawed by the decision, although many city attorneys declare they will carry the cases to the highest court to determine if the state has the power to rule absolutely in such cases. La Crosse, Wis., has an ordinance fixing the speed at street intersections at 6 miles per hour. The attorney general says local requirements are taken care of the provision in the state law which requires every driver to proceed at a speed which is "reasonable and safe" at all times.

NEW ORLEANS, Aug. 24—European automobile manufacturers are securing an advantage in Latin America which is certain to cost American factories many sales. With the exception of Mexico City, Buenos Aires and Rio de Janeiro, makers of American cars have neglected active efforts in the cities which lie south of the Rio Grande. On learning that the streets of practically all of the places were paved with cobblestones for the most part, the tendency has been to postpone any idea of propagation that may have been entertained until better streets are constructed.

European manufacturers have adopted different tactics. They have secured high-class agents whose duty has been to stir up a desire for better streets rather than attempt to make immediate sales of cars.

Richmond to Have Annual Show

Automobile Association Seeks Charter With the Object of Holding Exhibitions—Atlanta's Show to Take Place Early in Fall

RICHMOND, VA., Aug. 26—The Richmond Automobile Association has petitioned the state corporation commission for a charter. The maximum capital of the new corporation will be $50,000 and will be limited to the ownership of 10 acres of land. The object of the association is to hold annual automobile shows, the first one being proposed for February of next year. There are now near on to 3,000 automobiles in use in Richmond and it is thought this number will be greatly exceeded by the time of the first show.

Officers of the Richmond Automobile Association are J. T. Anderson, president, and W. D. Wartton, secretary and treasurer. The board of directors will consist of the officers named and E. D. Hotchkiss, Jr., Barton H. Grundy and Leigh R. Page.

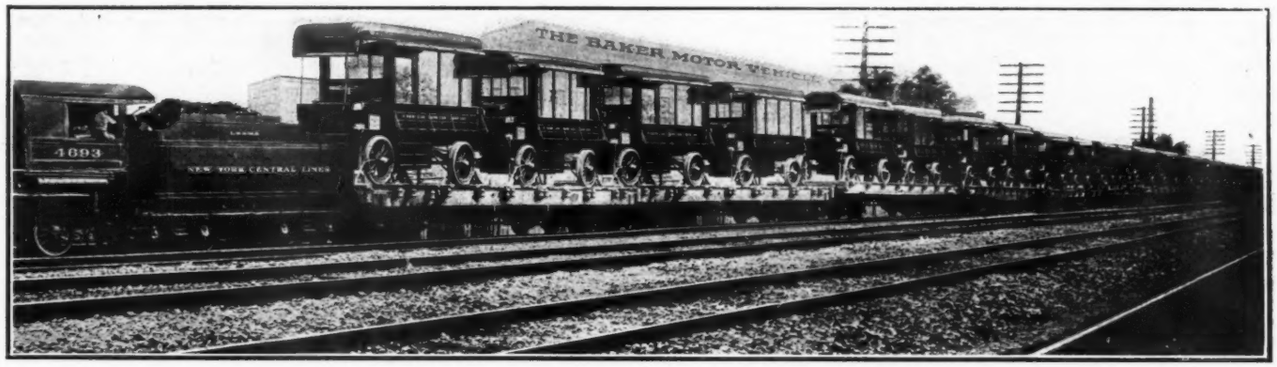
Atlanta Plans an Early Show

ATLANTA, GA., Aug. 26—Plans are going steadily forward for Atlanta's third automobile show, which is scheduled for the early fall.

Instead of having the show at the tag end of the Southern buying season, as was the case last year, this one will be given at a time when Southerners are beginning to buy cars, it will come at a time when money is easiest in Dixie and it will come before any other shows have taken the edge off the enthusiasm of prospects. The dealers in automobiles and accessories who constitute the Atlanta Automobile and Accessories, the promoter of the exhibition, are inclined to be sanguine as to the amount of business to be done as a result of the show.

Already arrangements have been made to combine with another exhibition which comes after the automobile show in the matter of decorations and in this way the automobile show will get the benefit of decorations that cost $16,000 at a price a great deal less than that.

Wylie West, acting as chairman of the show committee of the Atlanta Automobile and Accessory Association, is in general charge of the work.



Trainload of electric delivery wagons leaving the factory of the Baker Motor Vehicle Company, Cleveland, O.

TRAIN Load of Trucks—The accompanying photograph represents a recent partial shipment of Baker electric trucks to the American Express Company. When the cars now on order are shipped the American Express Company will have Baker electric trucks in service in eighteen cities as follows: New York, Chicago, Boston, Dallas, Portland, Springfield, Buffalo, Milwaukee, Lawrence, Mass., Kansas City, Memphis, Worcester, Syracuse, Rochester, St. Louis, Cleveland, Cincinnati, Los Angeles.

Hupmobile Honored at Turin—The Hupmobile was given first prize for cars of its class at the recent first International Motor Exposition held at Turin, Italy.

Trautman Is Manager—C. W. Trautman has been appointed manager of the Buffalo, N. Y., factory branch of the Detroit Electric Company.

Whitney Department Moved—W. N. Whitney & Co., Albany, N. Y., has moved its automobile department to 450 Central avenue, which salesroom and service station was formerly occupied by the United Motor Albany Company.

President MacAlman Back—President John H. MacAlman, of the Boston Automobile Dealers' Association, has just returned from a 2 months' tour of Europe, during which he visited all the large cities on the other side and inspected the various motor car factories.

Stuart Withdraws from Company—George C. Stuart, for a long time a member of the Mank-Stuart Motor Car Company, agents for the Cadillac at Portland, Me., has withdrawn from the firm and the company is now known as the Miles B. Mank Motor Car Company.

Bisons After Road Men—The Automobile Club of Buffalo, N. Y., has come out with vigorous arraignment of the New York State Highway Commission appointed by Governor Dix alleging that the abominable condition of the roads throughout the state, and particularly in Erie County, has been brought about by political favoritism and incompetency.

Motor Line in Franklin Park—James F. Shea, recently appointed superintendent of the Boston park system, started a motor bus line through Franklin Park, one of the biggest parks in the country, last Saturday, his aim being to make the place more popular. The cars start from Blue Hill avenue and over 2 miles at a leisurely gait, being driven by chauffeurs in the employ of the city.

Field Day for Chalmers Men—The first field day of the employees of the Whitten-Gilmore Company, of Boston, Mass., agents for the Chalmers line, took place last Saturday, when special cars conveyed the men and their friends to Glen Echo Park, Stoughton. A number of athletic events were run off and the day ended with a dinner at which E. A. Gilmore and Charles E. Whitten were the honored guests.

Large Registration in Minneapolis—The city assessor of Minneapolis has listed 4,724 automobiles in 1912, as compared with 3,044 in 1911. The valuations are $2,296,900 and $1,721,655. The value of the additional machines, 1,700 in all, is given at $571,000. This is on a 50 per cent. basis. The fourth ward, containing some of the best families, reports 1,848 machines, and the eighth, similarly blessed, reports 1,017 cars.

Burlington Wants More Time—The aldermen of Burlington, Vt., are considering a plan to put into force traffic regulations for the business section of the city to apply to all vehicles because of the increase in the motor traffic. Some of the regulations seemed to be too drastic, one in particular providing for a 4-mile limit while passing along by street cars. The matter has gone over for further investigation.

Danger in Mexico—Rebel activities close to towns in the Federal District and close to the limits of the City of Mexico are causing a falling off in motor car touring in this section. The dead bodies of a chauffeur and another occupant of an automobile were found lying upon the highway near a suburban town recently, and it is supposed they were killed by Zapatistas, as the rebels under Emiliano Zapata are called. It is even considered dangerous to make the trip to and from the Country Club at night.

Automobiles Excluded at Isleboro—As a result of Capt. F. C. Pendleton, of Brooklyn, N. Y., driving his automobile through the roads of Isleboro, Me., that had been shut to motor traffic on the grounds of an unwritten law the residents of that town called a special town meeting and by a vote of 58 to 7 directed the selectmen to take steps to exclude automobiles from the island kingdom. The selectmen are in a quandary for they do not know whether or not they have the authority to exclude motor vehicles from the town limits. If they find they cannot do so a bill will be sent to the next legislature asking for such authority.

New Agencies Established During the Week

Place	Car	Agent
Aberdeen, S. D.	R-C-H	Worthington Auto Co.
Alliance, O.	R-C-H	C. O. Scranton
Battle Creek, Mich.	KisselKar	B. C. Kirkland
Buffalo, N. Y.	Henderson	Zimmer Motor Vehicle Co.
Buffalo, N. Y.	Hupp-Yeats	L. G. Schoepflin Co.
Buffalo, N. Y.	Ideal Car	E. E. Grimmel
Buffalo, N. Y.	R-C-H	L. G. Schoepflin Co.
Burlington, Vt.	R-C-H	A. F. Lauzon & Co.
Chatsworth, Ill.	R-C-H	J. C. Gelmers
Columbus, O.	Everitt	Everitt Auto. Co.
Columbus, O.	Garford	O. G. Roberts & Co.
Columbus, O.	Richmond	J. Renner
Dubuque, Ia.	KisselKar	Lupper-Bishop Auto. Co.
Easton, Pa.	Franklin	Shannahan & Wrightson Co.
Indianapolis, Ind.	Marathon	Finch & Freeman Auto. Co.
Indianapolis, Ind.	Nyberg	Finch & Freeman Auto. Co.
Indianapolis, Ind.	Regal	Finch & Freeman Auto. Co.
Jacksonville, Fla.	R-C-H	R. Kloeppel
Kalamazoo, Mich.	KisselKar	W. C. Grace
Kaufman, Tex.	KisselKar	J. C. Bryant
La Crosse, Wis.	KisselKar	Fox Brothers
Lone Tree, Ia.	KisselKar	Zimmerman Steel Co.
Longview, Tex.	KisselKar	W. D. Sessum
Manitoba, Can.	Marmon	Lion Auto Garage
Marshall, Mo.	Kissel-Kar	H. Lowenstein & Co.
Milwaukee, Wis.	Velie	Blenheim Garage
Minneapolis, Minn.	Little	Minnesota Motor Car Co.
Minneapolis, Minn.	Mercer	Mercer Motor Sales Co.
Minneapolis, Minn.	Staver	Eng Olsen
Nashville, Tenn.	KisselKar	Howard Douglas
Omaha, Neb.	Little	Doty & Hathaway
Omaha, Neb.	Paige-Detroit	Mitchell Motor Car Co.
Omaha, Neb.	Reo	Doty & Hathaway
Portland, Maine	Franklin	W. M. Chellis
Portsmouth, O.	Abbott-Detroit	Portsmouth Auto & Machine Co.
Portsmouth, O.	Paige-Detroit	Portsmouth Auto & Machine Co.
Regina, Can.	KisselKar	D. L. Boureau
Rochester, N. Y.	KisselKar	Ball-Washburne Motor Co.
Rochester, N. Y.	Mitchell	E. W. Fisher
Salisbury, Md.	KisselKar	L. D. Collier
Sedalia, Mo.	KisselKar	W. C. Evans
South Bend, Ind.	Haynes	S. & C. Auto Co.
Spokane, Wash.	Buick	E. G. Finlay
Spokane, Wash.	National	E. G. Finlay
Washington, D. C.	KisselKar	E. H. Bauer
Welland, Ont.	Ford	A. N. B. Nepp
West Point, Neb.	KisselKar	Brown Brothers
Wheeling, W. Va.	Marmon	R. C. Bowman
Whitestown, Ind.	R-C-H	Clark & Smith

COMMERCIAL VEHICLES

Rochester, N. Y.	Dart	John Grape
Washington, D. C.	Atterbury	Motor Truck Co.
Washington, D. C.	Hatfield	Motor Truck Co.

Studebaker's Atlanta Building—The Studebaker Corporation, Atlanta, Ga., has arranged for a four-story fireproof building at Peachtree and Harris streets for its store in that city.

Toledo to Frisco in 19 Days—Richard Sheldon, a Toledo, O., automobile enthusiast, drove his new Chalmers Six into San Francisco, Cal., recently, after 19 days of actual running time.

Licenses Fatten Ohio Treasury—State Treasurer Creamer, of Ohio, credits the automobile department of the state with having brought into the state treasury $33,874.59 during the months of June and July.

Two Trucks for Toledo—Service Director Cowell has been authorized by Council to expend $9,000 for two 5-ton trucks to be used by the street department in hauling garbage from the collecting stations to the reduction plant.

Horses Scarce in Manitowoc—The assessment list of Manitowoc, Wis., gives but 549 horses for 1912, as compared with 721 in 1911. The number of motor cars owned in the city in 1912 is 152, as compared with 75 a year ago.

Williams With Locomobile—L. W. Williams, for some time connected with the advertising department of the Locomobile Company, Bridgeport, Conn., has recently entered the truck sales department of the same company.

Wilson Eastern Sales Manager—George D. Wilson, sales manager of the Warren Motor Car Company, has resigned to take charge of the sales of the Warren car for several eastern states with headquarters in New York City.

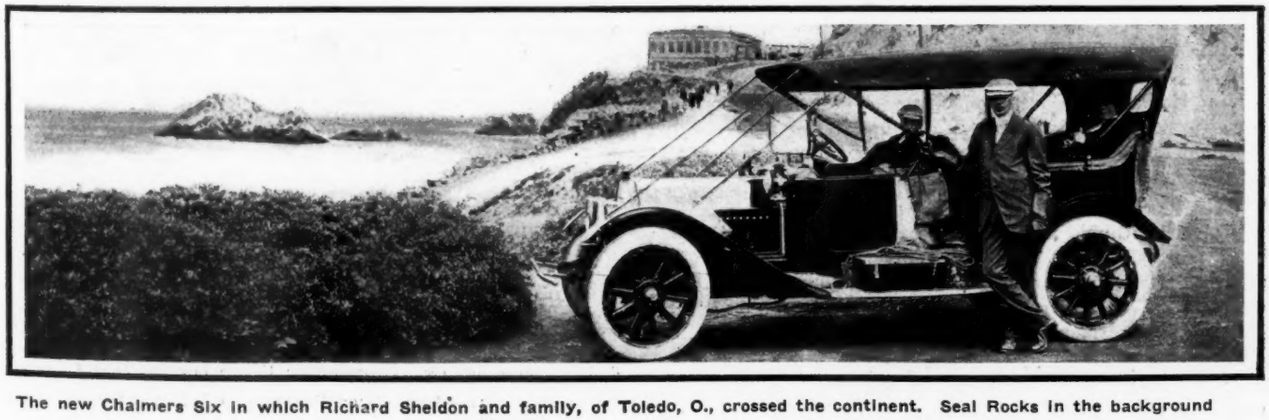
White Truck Takes Prize—A White 3-ton truck took the silver loving cup at the Long Branch Business Men's parade, Long Branch, N. J. The prize was offered on the basis of appearance, quietness of engine and lowest cost of upkeep.

Dennis Company's Toledo Quarters—The Dennis Motor Company, Toledo, O., agents in Ohio and southeastern Michigan for the Alco, Cino, Rambler and Detroit electric cars, have moved into their new quarters at Madison avenue and Fifteenth street.

Abolishing Water Bars—D. T. Bates, supervisor of highways for Bennington County, Vt., has declared war on the old-fashioned water bars and he has already wiped out more than sixty on the road between Pownal and the Rutland county line. There are 103 others remaining and these will be removed speedily.

Weeks' Permit for Canada—The custom service in Canada has inaugurated a new system of permits which adds greatly to the pleasure in taking Canadian tours in automobiles. With the present arrangement it is possible to get a 7-day permit to drive a car, licensed in the United States, through Canada. This permit is secured from the custom official at the point of entry.

Motorists' Mecca, Atlantic City—Motorists' Mecca is what Atlantic City, N. J., may be called during the week of September 30 to October 5. In the holding of the American Road Congress, the American Automobile Association is co-operating with the American Association for Highway Improvement, while the National Association of Road Material and Machinery Manufacturers will conduct a most comprehensive exhibit on the big pier.



The new Chalmers Six in which Richard Sheldon and family, of Toledo, O., crossed the continent. Seal Rocks in the background

New salesroom and garage of the Chicago Lozier branch

New Road for State Fair—Owners of automobiles will find a new road and free parking space at the state fair, Detroit, Mich., September 16 to 21.

Seely School's New Quarters—The Seely Automobile Sales and Training School has moved into its new quarters in the Ireland Building, South Bend, Ind.

Jiffy Company's Detroit Office—The Jiffy Automobile Curtain Company has opened a general sales office in Detroit with headquarters at 527-528 Ford Building.

Angier Joins Pope Forces—Irving O. Angier has joined the sales forces of the Pope Manufacturing Company, Hartford, Conn., as traveling salesman and will cover the Southern States.

Davidson Goes to Detroit—M. D. Davidson, formerly with the Boston branch of the Oldsmobile and also the R-C.H salesforce in the Hub, has gone to Detroit to accept a position as district sales manager with the R-C-H company.

Keyless Lock Company's Factory—A two-story, fireproof factory building, in which will be manufactured brass and aluminum motor car castings, is being erected in Indianapolis, Ind., by the Keyless Lock Company. It will cost about $75,000.

Pennsylvania Issues 55,000—The Automobile License Bureau of the State Highway Department, Pennsylvania, has issued 55,000 licenses to date, and applications are coming in every day.

Brevard Joins Zenith Company—Proctor Brevard, experimental engineer of the Hudson Motor Car Company, has resigned and joined forces with the Zenith Carburetor Company, Detroit, Mich.

Milwaukee's Orphans' Day Outing—The sixth annual orphans' outing of the Milwaukee Automobile Club, Milwaukee, Wis., was held on August 28. William H. Pipkorn, manager of the first five outings, was again in charge.

New Kalamazoo Company Formed—A new company has been formed in Kalamazoo, Mich., under the name of the National Compression Mixer and Primer Company, to manufacture a device which will eliminate the waste gasoline in automobile engines.

Wolverine Club's Elections—Bert Miller has been elected to the board of directors of the Wolverine Automobile Club, Detroit, Mich., in place of Charles Gilmour, who recently resigned. W. G. Bryant, the club's attorney, has been elected vice-president.

Ware Company Building Factory—The Ware Motor Vehicle Company, St. Paul, Minn., is building a concrete factory at Raymond and University avenues in that city. The company is building a four-wheel drive car in four models: 1,500 to 2,000 pounds, 1 1-2-ton, 2-ton and 3-ton types. The Model gas engine is incorporated in the machine and Wilcox-Bennett carbureter.

Oldsmobile Has Moved—The Boston, Mass., branch of the Oldsmobile Company has moved into the new building erected for it on Commonwealth avenue and now just as soon as renovations can be made in the old quarters on Massachusetts avenue and Newbury street the Boston branch of the Buick will be moved there from the Motor Mart.

Changes in Packard Staff—Russell Huff has been made consulting engineer; J. G. Vincent, chief engineer; G. R. Bury, manager motor carriage sales department; G. S. Loomis, manager specifications department; C. R. Norton, manager of truck sales, and C. E. Morton, assistant in the truck sales department of the Packard Motor Car Company, Detroit, Mich.

Campbell Continues Good Work—Secretary Chester I. Campbell, of the Boston, Mass., Automobile Dealers' Association, who recently took 3,000 orphan, blind and crippled children on an outing, gave another outing to the inmates of the almshouse and home for aged couples of Wollaston and Quincy, taking about 50 on a trip to Sharon, where they all had a delightful day.

Reorganize Berkshire Motors Company—A meeting of the stockholders of the Berkshire Motor Company was held in Boston a few days ago for the purpose of reorganizing the concern. The Pittsfield Electric Company recently placed an attachment for $2,500 upon the stock of the company and this brought about the plan to reorganize because of the effect upon the company's credit.

Dallas Joins Anti-Noise Cities—The decision of the Dallas city government to permit the use of all adequate automobile warning signals and to restrict the use of all signals to an abrupt short sound means that Dallas will hereafter take rank with Chicago, St. Louis and all other cities in that regard. The City Commission merely passed an ordinance making it a violation of the law to make unnecessary noises.

Automobile Incorporations

AUTOMOBILES AND PARTS

BRANTFORD, ONT.—Keeton Motors, Ltd.; capital, 200,000; to manufacture automobiles. Incorporators: Forrest M. Keeton, William G. Houck, William J. Verity.

CAMBRIDGE, MASS.—Blake Automobile Company; capital, $100,000; to deal in automobile business. Incorporators: E. C. Blake, L. E. Gibson.

COLUMBIA, S. C.—Lyon Motor Car Company; capital, $50,000; to manufacture automobiles. Incorporators: E. B. Lyon, J. M. Black, J. E. Johnson.

CORTLAND, N. Y.—Brockway Motor Truck Company; capital, $100,000; to manufacture motor trucks. Incorporators: George A. Brockway, Charles S. Pomeroy and Frederick R. Thompson.

DETROIT, MICH.—Standard Motor Truck Company; capital, $50,000; to manufacture motor trucks. Incorporators: Howard Wilcox, W. K. Ackerman.

INDIANAPOLIS, IND.—Mais Motor Truck Company; capital, $1,000,000; to manufacture motor trucks. Incorporators: Frank H. Wheeler, Walter M. Pearce, S. Lockard, William H. Brown, Jacob V. Stimson, Henry G. Francis.

JAMESBURG, N. J.—Ex-Cel Motor Trust Company; capital, $250,000; to manufacture automobiles. Incorporators: T. C. Corwin, A. Englehardt, A. A. Kelley.

LA CROSSE, WIS.—General Motor Car Company; capital, $10,000; to deal in motor cars and commercial cars. Incorporators: Joseph P. Krett, Louis L. Fox, Henry F. Fox.

LAWRENCE, PA.—Lawrence Automobile Company; capital, $40,000; to deal in automobiles. Incorporators: L. C. John, Earl M. Kyle, J. P. Gill, J. P. Cope, C. A. Brookover, George Greer, R. M. Jamison, T. F. Moorehead.

MANSFIELD, O.—Eagle & Vincent Automobile Company; capital, $15,000; to manufacture automobiles. Incorporator: C. H. Engle.

NEW YORK CITY, N. Y.—Curran Patent Company, Manhattan; capital, $10,000; to manufacture motors. Incorporators: Harry L. Curran, Charles H. Wilson.

NEW YORK CITY, N. Y.—Harman-Yount Company; capital, $10,500; automobiles, etc. Incorporators: Daniel H. Hanckel, Frederick B. Hunt, Helen M. Kelly.

NEW YORK CITY, N. Y.—Henderson Eastern Motors Company; capital, $20,000; to manufacture automobiles. Incorporators: Harry Harris, E. Knight Harris, Leopold Friedman.

NEW YORK CITY, N. Y.—George Leveene Company; capital, $5,000; to deal in automobiles, etc. Incorporators: George Leveene, John L. Meyer, Charles E. Lauten.

OWENSBORO, KY.—Ames Motor Company; capital, $100,000; to manufacture automobiles.

New Lee Tire Agency—The Kelly-Field Company, Philadelphia, Pa., are sales agents for Lee tires.

Start-Lite Jackson Equipment—The Jackson Automobile Company, Jackson, Mich., has adopted the Start-Lite Junior lighters for 1913 standard equipment.

Barnard's Grand Rapids Branch—Augustus H. Barnard, sales manager for the Grand Rapids Motor Truck Company, has established a branch in Minneapolis.

La Vigne in Detroit—The La Vigne Gear Company, originally of Detroit, Mich., is about to leave Milwaukee, Mich., its present quarters, to return again to Detroit.

Ford Shipment Largest Made—The largest shipment of automobiles ever made has just left Detroit, Mich., for Kansas City, Mo. In the shipment were 630 complete Ford cars.

Roberts Is Transferred—C. L. Roberts, of the New York City branch of the Marquette Company, has been transferred to the Oakland division of the General Motors Company.

Dutch Rubber Company Incorporated—The Dutch Rubber Company, Akron, O., was recently incorporated with a capitalization of $1,250,000 to manufacture and sell rubber articles.

Oakland's 1913 Plans—The Oakland Motor Car Company of Pontiac, Mich., will turn out 11,500 cars for 1913. For the coming year a six-cylinder model and also a car at $1,075 have been added.

Denver-Salt Lake Record—Frank Botterill, of Salt Lake City, Utah, and E. M. Grady, of Denver, Col., made the trip from Denver to Salt Lake City in two days, excelling any attempt heretofore by at least 2 miles to one.

Moore with Gramm-Bernstein—W. H. Moore has resigned from the Gramm Company, Lima, O., to take a position as manager of the sales department of the Gramm-Bernstein Company, truck manufacturers, Lima, O.

Overland's Buffalo Building—The Willys-Overland Compani, Toledo, O., has purchased land at Main and St. Paul streets for the construction of a three-story building to be used as a salesroom for the Buffalo branch of that company.

Automobile Incorporations

SAN ANTONIO, TEX.—Guarantee Motor Car Company; capital, $10,000; to engage in the automobile business. Incorporators: J. F. Hagan, H. J. Smith, C. W. Voss.

GARAGES AND ACCESSORIES

BALDWIN, L. I., N. Y.—Acme Automobile Rental Company; capital, $5,000; to carry on a renting business. Incorporators: George Wintjen, Adam Meiselbach, Allen C. Ewing.

BUFFALO, N. Y.—Buffalo-Akron Transit Company; capital, $2,000; to engage in automobile bus line, etc. Incorporators: William H. Pensyres, Gilbert Kunz, Fred Christiansen.

CLEVELAND, O.—Mutual Oil & Automobile Supply Company; capital, $10,000; to deal in supplies. Incorporators: M. L. Steuer and others.

COLUMBUS, O.—Southern Taxicab Company; capital, $10,000; to engage in the taxicab business. Incorporators: James J. Keating and others.

HEMPSTEAD, N. Y.—Smith's Garage; capital, $2,000. Incorporators: Lawrence Schultz, Joseph Pensock, Ray McCombs.

INDIANAPOLIS, IND.—Koogle Automobile Company; capital, $10,000; to conduct a repair business and also to sell tires and tops. Incorporators: I. G. Koogle, O. P. Kline, L. D. Buenting.

MACON, GA.—Wade Garage Company; capital, $12,000; to carry on a garage business. Incorporators: Phelps Wade, Edward T. Wadley, M. E. Richardson.

NEW YORK CITY, N. Y.—Reliance Taxicab Company; capital, $500,000; to conduct a taxicab business. Incorporators: Nicholas F. Yeagle, Elizabeth Yeagle, Katherine Lally.

NEW YORK CITY, N. Y.—Fox-Hegyi Company; capital, $6,000; to paint and repair automobiles. Incorporators: Otto Hegyi, Ida Hegyi.

TOLEDO, O.—Walker Tire Chain Company; capital, $150,000; to manufacture a patented anti-skid automobile and truck chain. Incorporators: H. F. Rohrman, Hugh Williams, Maurice A. Carter, Charles E. Newman.

YOUNGSTOWN, O.—Folberth Carbureter Company; capital, $70,000; to manufacture a carbureter. Incorporators: E. A. Hegg, J. F. Williams, Thomas L. Morgan.

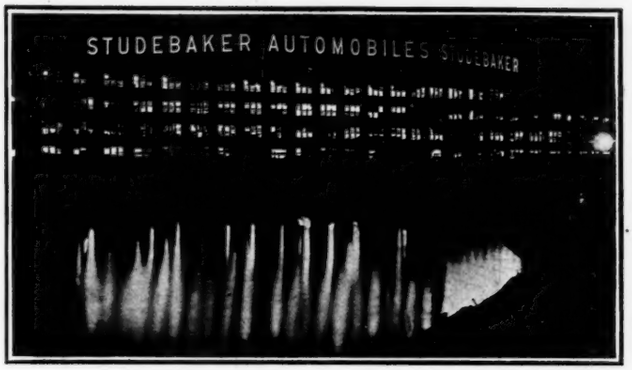
CHANGES OF CAPITAL

DAYTON, O.—Nation Automobile Company changed its name to Majestic Motor Car Company.

DETROIT, MICH.—Ignition Starter Company; increase of capital to $500,000.

CLEVELAND, O.—South End Garage Company; increase from $500,000 to $1,000,000.

PITTSBURGH, PA.—Penn Motor Car Company; increase from $5,000 to $141,950.



Detroit plant of Studebaker Company and electric sign

Stowe Elected Vice-President—George H. Stowe became a stockholder and was elected vice-president in charge of the sales at the annual meeting of the stockholders of Carl H. Page Company, New York City dealers in Chalmers cars.

Auction Sale Accessory Company—On Wednesday, September 4, 1912, at 2 o'clock p. m., at 1516 Grand avenue, Kansas City, Mo., there will be a bankrupt auction sale of the entire stock of automobile accessories of the Auto Specialty Company.

Automobile Displaces Horse—An old horse drawn stage that has been in service for nearly 50 years between New Albany and Corydon, Ind., has been displaced by an eight passenger motor car bus. The motor car is making two round trips daily.

Encouraging Michigan Writers—Michigan is laying plans to have her boys wrest literary honors from Indiana, the State Fair Association having set a premium on literary effort in the awarding of an R-C-H car to the boy who shows best in essay writing.

Charges Against Gasoline Dealers—Attorney G. A. Will, of the Automobile Club of Minneapolis, Minn., has complained to the state oil inspection department that some dealers are delivering a lower test gasoline than automobilists are paying for. Samples have been taken from supply houses to investigate the charge.

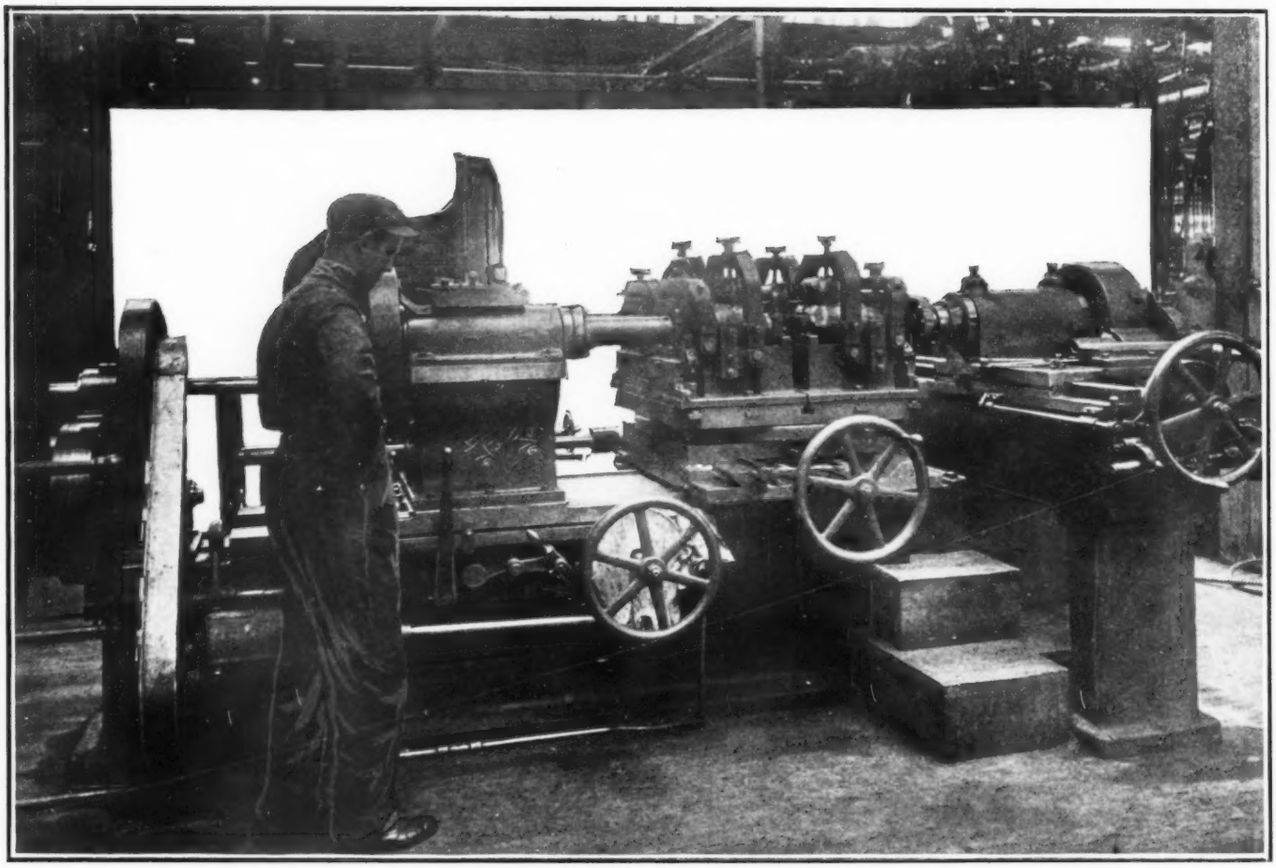
Book on Record Run—A booklet on the record run of the Wolverine-Detroit commercial car in the Wolverine Automobile Club run from Detroit, Mich., to Indianapolis, Ind., and back has just been issued. A brief account of the run is given, together with interesting illustrations depicting the rough roads encountered.

Studebaker Has Immense Sign—What is claimed to be the largest electric sign in the world has been installed by the Studebaker Corporation on its Detroit factory, which is plant No. 5 of the company's chain of works. The sign, which is illustrated herewith, contains, according to the Studebaker company, more than 2,000 electric bulbs which make it visible for a very considerable distance.

State Road Contractors Warned—C. Gordon Reel, State Superintendent of Highways of New York, has notified the Touring Club of America that state road contractors have been instructed not to leave tarred stone roadbeds unprotected by a top dressing between the close of work on Saturdays and the beginning of work on Mondays, a period during which motor traffic is generally the heaviest.

Starter Company Adds Plant—To manufacture the Disco electric lighting, starting and ignition equipment, the Ignition Starter Company, Detroit, Mich., has taken over the plant of the Gray Motor Company, giving the Ignition Starter Company 20,000 square feet of additional floorspace. The increase in the capital stock to $500,000 has been based on the increased value of assets of the company and for putting new capital into the business for further developments.

Factory Miscellany



Showing the machine used for boring out cylinders in the factory of the Lozier Motor Company, Detroit, Mich.

This is a view of the big Beaman & Smith milling and boring machine used in the factory of the Lozier Motor Company, Detroit, Mich. The complete machine which is shown in operation is capable of simultaneously finishing eight cylinders which are cast in pairs. While four of the cylinders are being bored out the other four are in the milling part of the machine. The milling part of the device is shown in the foreground, while the boring cutter is located in the rear of the machine away from the operator. As the machine is shown it is working to its capacity, that is to say, there are four of the cylinders in the miller and four in the boring part of the instrument. By mounting the cylinders on the turntable in the manner indicated they can be readily swung from the boring cutter to the miller. It requires 30 minutes to mill and bore a set of cylinders while the size to which they are bored is regulated entirely by the diameter of the cutter which can be changed at will.

TIMKEN'S Factory Nearly Completed—The new four story addition to the Timken-Detroit axle plant is rapidly approaching completion. It is 150 feet long and 75 feet wide. The shipping department will occupy the ground floor, while the other three will be devoted to manufacturing purposes.

Luverne's Six-Cylinder Car—The Luverne Automobile Company, Luverne, Minn., announces the addition to its line of a 50-horsepower, 6-cylinder Luverne touring car.

Moves to New Bedford—The William A. Carroll Company, of Merrimac, Mass., which manufactures carriages, automobile bodies and other vehicles, is to move shortly to New Bedford, Mass., where a new factory has been built for the company.

Timken Adds Modern Shop—The Timken Roller Bearing Company is adding to its Canton, O., plant the most modern grinding shop in the world. Dimensions of the newcomer to the factory group are 64 by 240 feet. The building will be ready for occupancy November 1.

Mutilate California Road Signs—The Automobile Club of Southern California is giving serious attention to discouraging the practice of shooting up or otherwise multilating the road signs which have been found so convenient to tourists and which have been erected at much expense.

Put on Night-Shifts—The American-La France Fire Engine Company, Elmira, N. Y., has been forced to put on night-shifts to care for the business that is being received from every section of the United States. Since July 1 four complete motor-propelled fire-fighting trucks have been shipped from the local factory every week and at least one new order for a fire truck is being received daily.

Kalamazoo's Axle Company Remains—The automobile axle department of the Lee & Porter Manufacturing Company will remain in Buchanan, Mich. The deal by which this department was to have been taken over by a Kalamazoo company and removed to Kalamazoo has fallen through. The Lee & Porter company is considering the manufacture of automobile bodies as an addition to its present product.

Firestone's Office Building—The contract for the erection of a one-story office building for the Firestone Tire & Rubber Company, Akron, Ohio, has been awarded to Morrison & Errickson, of Akron.

Jones Speedometer Adds Factory—The Jones Speedometer, New Rochelle, N. Y., has facilitated its shipments by adding a factory, much larger than its plant at New Rochelle, at Bush Terminal, Brooklyn, N. Y.

Takes Big Contract—The Columbus Buggy Company, of Columbus, Ohio, has entered into a contract with Tyler Bros., of Boston, Mass., to furnish that concern with 100 Columbus-electric cars for distribution in New England.

Hess-Bright Moves Office—The Hess-Bright Manufacturing Company, Philadelphia, Pa., moved its office July 5 from Twenty-first street and Fairmount avenue, Philadelphia, to its new factory at Front street and Erie avenue, of that city.

Newspaper Men Visit Factories—Newspaper men have been flocking to Detroit, Mich., during the past few weeks on a tour of inspection of her automobile factories. Up to the middle of August scores of reporters, automobile department editors, advertising representatives and even newspaper proprietors had called at the several factories.

Michigan Buggy Enlarges Factory.—The Michigan Buggy Company, Kalamazoo, Mich., has found it necessary to enlarge its factory and ground has been broken for a 50,000-foot addition. This annex will directly adjoin the main factory building on the north side. The basement of the new building will be an addition to the service department of the company, which is said to be conducted on a modern and efficiency basis.

Ford's Walkerville Factory Addition—The Ford Motor Company, of Canada, has let contracts for an addition to the plant at Walkerville, the new addition being 75 by 505 feet. It will be four stories high, of concrete, and will be an extension of the present building. The total floor area will be about 300,000 square feet. It is the intention of the company, next year, to build all its parts in Canada. In subsequent seasons, however, they will have a strictly made-in-Canada car.

Tent Used by Henderson—Having started shipments for 1913 cars, and being crowded for room to manufacture its cars, the Henderson Motor Car Company, Indianapolis, Ind., has erected a huge tent in the factory yard to facilitate matters. The big white top has a diameter of 80 feet. Until the new addition to the factory is ready for occupancy, September 15, the overflow from the first assembly will be housed under the canvas. The tent, which was raised recently, has a capacity of over 30 cars, and will relieve much of the congestion in the factory.

Haynes Installs Fire Protection—A complete fire-protection system has been installed in the Kokomo, Ind., factory of the Haynes Automobile Company. It consists of an extensive sprinkler net extending throughout the plant, the water being supplied from a 75-foot water tower which contains at all times 50,000 gallons of water which is fed to the sprinklers by gravity. In addition to this a large electric pump is being installed which will be capable of supplying water to a number of points in the plant. Furthermore, hydrants communicating with the municipal fire department are scattered throughout the building.

Berlin's New Rubber Factory—The property owners of Berlin, Ont., carried a by-law granting a bonus of $25,000 to the Canadian Consolidated Rubber Company, for the purchase of 15 acres on which to erect an automobile tire factory. The company, which has already extensive interests in Berlin, receives the $25,000 and a fixed assessment for ten years for that amount, after it has expended a quarter of a million dollars in buildings and equipment. The company agrees to employ 100 skilled workmen the first year, 200 the second and 500 in five years. The building operations are to commence immediately.

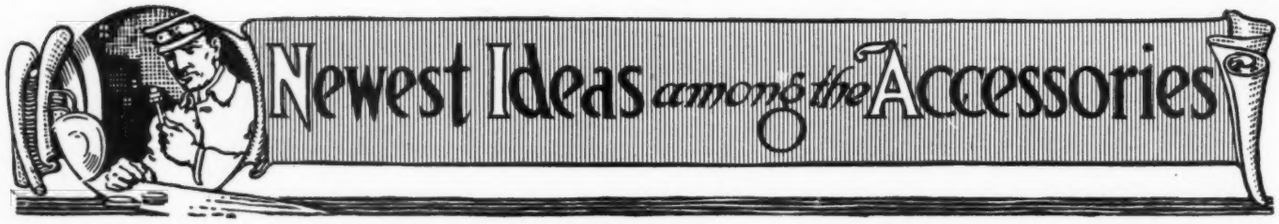
To Double Its Facilities—The Milwaukee Auto Specialty Company, Milwaukee, Wis., manufacturing Radium batteries, ignition devices, tire irons, bumpers and other motor car accessories and specialties, has started work on the erection of a new building, to occupy the entire corner of Seventh and Chestnut streets, adjoining its present works. The building will cost $25,000 equipped. The company recently purchased the former Zwietusch soda fountain factory at Seventh and Chestnut streets, including adjoining acreage, and the growth of the business has made necessary the doubling of its manufacturing facilities.

Krit Constructs Testing Track—The Krit Motor Car Company, Detroit, Mich., has installed a novel test track on a piece of vacant property adjacent to its factory on Grand Boulevard. The company believes that by constructing this track it has eliminated the chances for accident, which are not small when testers drive their cars through the streets of the city. The track has been constructed to give the cars all road conditions in their try-outs. There is a smooth, level stretch for speeding, a rough place and a section of sand, so that the tester can determine the performance of the car on each of these types of road.

Newmastic Man to Make Rims—The Newmastic Tire Company, of New York City, has increased its working capital from $150,000 to $250,000, and besides enlarging its business in the line of tire filling, it will soon take up the manufacture of an entirely novel type of demountable rim, invented by O. A. Parker, a member of the company. This new rim will supplement the virtues of the filled casing and permit of adjusting the pressure in the tire filler in proportion to the load placed thereon. The method by means of which this end will be accomplished is the use of a locking ring which compresses the bead of the casing; this locking ring engages the rim in the manner of a nut wedging on to a bolt, so that the operative width of the rim may be decreased at will of the driver.

Hyatt Jersey Plant Busy—The Newark, N. J., plant of the Hyatt Roller Bearing Company is working to its full manufacturing capacity. Bearings and all their parts, as well as a large number of the machine tools required for their making, are produced and thoroughly tested at this factory. The Jersey plant of the company comprises half a dozen buildings, in which all equipment is directly driven by electric motors having a total of 1,000 horsepower, 500 of which are made in a gas producer, while six 200-horsepower steam boilers provide the remainder of the power which is generated in steam engines which drive electric dynamos. While the executive departments of the company are located at Detroit, Mich., the Newark plant has also a complete engineering staff which attends to all requirements and needs brought up by the production and sales departments.

Timken-Detroit Axle Company's new plant, now under construction



Pitless Turntable—Rattleproof License Plate Holder—Complete Tourists' Luggage—Roller Bearing Interchangeable With Ball Types—New Tire Tool—Remy Distributer of Bakelite—Portable Steel Garage

Pitless Automobile Turntable

THE Pitless Auto Turntable Company, 1316 West Ninth street, Kansas City, Mo., manufactures a turntable, Figs. 1 and 6, which may be installed in any garage or salesroom, as it requires no pit. The turntable consists of a circular frame which is braced by six diametrical stayrods; the frame has a smoothly ground surface and serves as a running track for eight casters on which the automobile to be turned is supported. This rests directly upon two parallel runways of a strong steel, which are 15 feet wide and 3 inches above the floor, being directly carried by four ball-bearing casters or rollers each. These rollers are connected by hangers to the runways and one of the rollers is equipped with a foot-brake shoe which, when applied to the periphery of the roller, holds it securely in position on the circular track. Another ball bearing, which is of the thrust type, supports the central portion of the turntable, where the stayrods intersect and are strengthened by a king bolt. Thus the track is the only portion resting directly upon the floor. The manufacturer supplies the turntable in any one of four sizes, which are designed for the operation of automobiles having wheelbases up to 90, 116, 124 and 145 inches. The tread range of the first type is from 46 to 56 inches and of the others from 50 to 60 inches, the runways being sufficiently wide to permit of tire changes being made on them. The turntable ranges in weight, for the various sizes, from 1000 to 1500 pounds and is shipped by the factory crated so that it may be readily installed at its destination by the owner.

Michigan Number Plate Holder

The latest type of license plate holder, made by the Michigan Sign Holder Company, 231 North Ionia avenue, Grand Rapids, Mich., is shown in Fig. 2. This license plate holder is made of strong sheet steel, 6 by 4 inches and may be attached to any portion of the radiator, bottom, top or face, by means of nuts and bolts inserted through the holes in the holder. The mechanism by means of which the license plate is held in place consists of three prongs the ends of which are bent over toward the front in U-style. Two of these prongs overlap the bottom edge of the plate, while one is in position near the middle of its top portion; the two prongs are slidable in tracks extending from bottom to top of the plate, and each may be locked in any position, independently of the other, by means of a screw. The upper, central prong is attached by a spring to the bottom portion of the holder and is also slidable in a track. In installing the plate in the holder, the two bottom prongs are positioned flush with the lower edge of the holder, the lower edge of the number plate is placed in their U-ends and the upper prong is drawn up until it snaps over the upper edge of the license plate and holds it securely in place. It is evident that the use of this holder obviates all rattling of the plate; another advantage is that the number plate may be easily and quickly exchanged without necessitating a change of the position of the plate holder or the removal of the same.

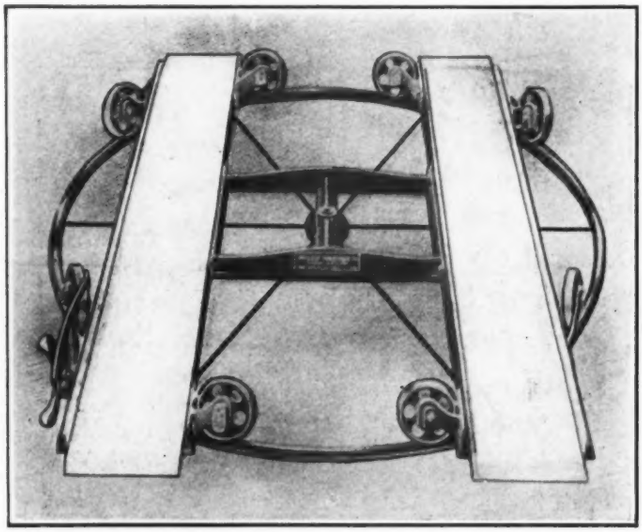


Fig. 1—Pitless automobile turntable for garages

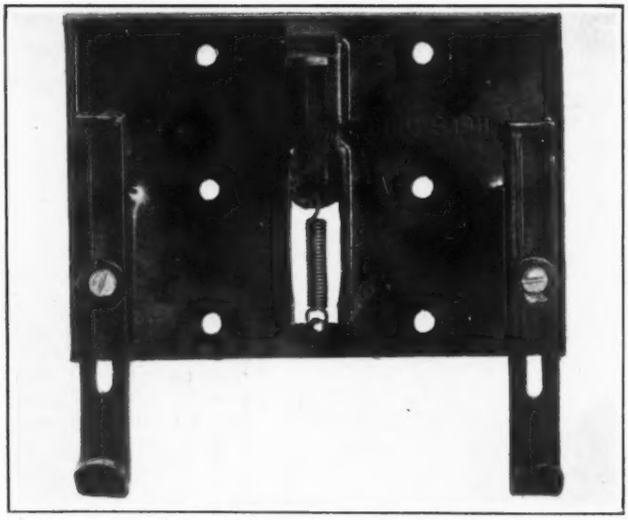


Fig. 2—Michigan automobile license plate holder

Moore-Packard Luggage Outfit

A touring luggage equipment comprising twelve pieces has been designed by C. J. Moore, of the Packard Motor Car Company, Detroit, Mich., which is specially adapted for the requirements of automobilists traveling in Packard cars. The equipment, Fig. 3, is very complete and designed to take care of whatever raiment and commodities are carried by such tourists, every piece being waterproof and having a special place on the automobile. It comprises two trunks which are carried on the trunk rack, together with a suitcase attached directly below them, two suitcases

carried on the left running board, a tire trunk on the right running board, a lunch kit on the left front fender and two suitcases above it, an ice box on the right front fender and a hat box above it and two suitcases which are carried inside the tonneau and directly under the robe rail.

The trunks are fitted with trays, the suitcases with dividing boards, and the ice box with two trays, one being intended for ice and the other for eatables. Sufficient ice may be carried to last for ten hours, even in summer. Complete lunch equipment for seven persons is contained in the lunch box.

Standard Interchangeable Bearing

Interchangeability with ball bearings of the same size is the feature of the latest type of annular roller bearing made by the Standard Roller Bearing Company, Fiftieth street and Lancaster avenue, Philadelphia, Pa. The same system of numbering as in ball bearings is used in this roller type which is claimed to have twice the carrying capacity and life of a ball design of the same size. The rollers are spaced in a retainer and have grooves which are engaged by annular projections on the races, whereby side movement of the former is prevented.

Nelson Never-Sware Tire Tool

The Miller Brothers Auto Supply House, 1105 Fourteenth street N. W., Washington, D. C., sells a small and handy tire tool, the Nelson, Fig. 5. It consists of a bar of iron bent at an obtuse angle to give two levers of different lengths, the shorter one of which is again bent in a right angle. Near the obtuse angle a ratchet lever is attached to the short arm along which it may be moved and be locked in any relative position thereto. Between this ratchet lever and the right-angled end of the short lever a hook is slidably arranged on the lever. If the hook whose end is designed to rest on a spoke is in this position near the felloe, it provides a pivot around which the right-angled end of the tool may be forced against the tire bead, holding it away from the rim and permitting of removing the locking rings, while the tool may be held in position by the proper adjustment of the ratchet lever.

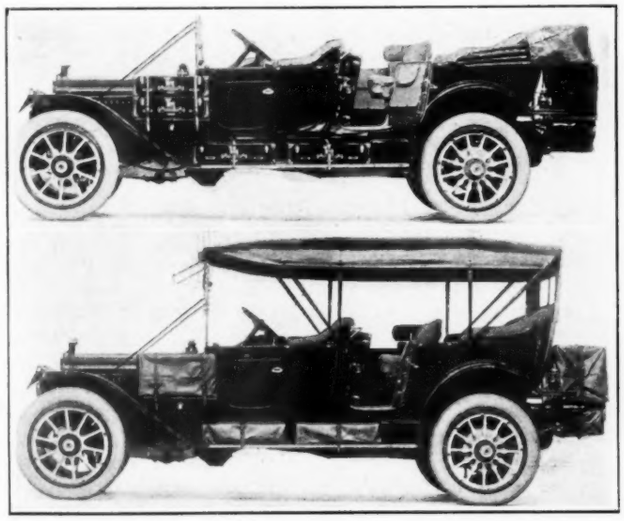


Fig. 3—Moore luggage equipment on Packard touring car

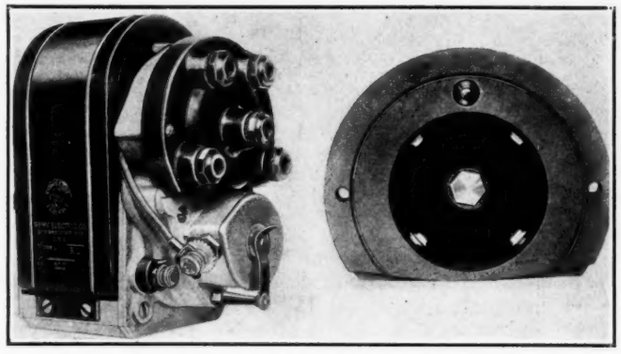


Fig. 4—Remy magneto with latest type of distributer

Remy Bakelite Distributer

Bakelite, an insulator material of recent origin, is used in the latest design of Remy magneto distributer, Fig. 4, constituting the main new feature thereof. The design of the distributer is not unlike former types but its size is larger than before, as may be seen in the view showing the distributer in place on the magneto. The principal new feature of design is the shape and location of the binding posts of the distributer. While the distributer formerly used on Remy magnetos had long posts which were vertically positioned on the top portion of the device, the latest type has short, converging addenda protruding from the front of the distributer casing.

Garry Portable Fireproof Garage

The portable fireproof garage made by the Garry Iron & Steel Company, Niles, O., may be furnished in any of three sizes, 12 by 16 feet, 14 by 18 feet or 16 by 20 feet, which weigh 1400, 1570 and 1825 pounds, respectively. The frame is of pressed-steel beams which are easily assembled and between which the wall sections of corrugated galvanized steel are installed. A gable roof covers the structure which has two double entrance doors, each of which is 4 feet wide and 8 feet high, and is provided with a padlock hasp. Each building has three fireproof windows.

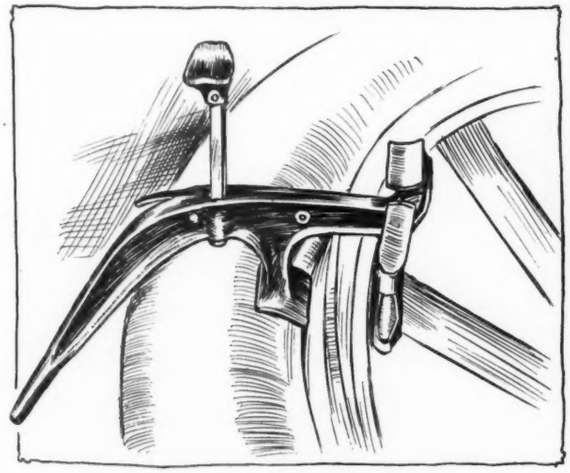


Fig. 5—Nelson Never-Sware tire tool

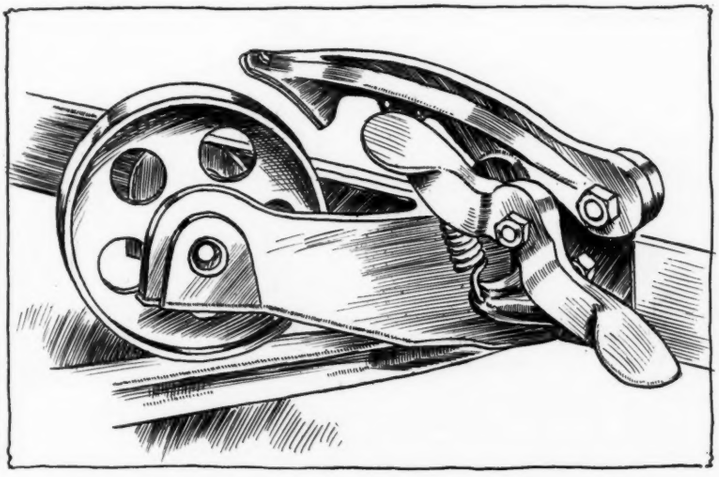


Fig. 6—Ball-bearing roller and brake shoe of Pitless turntable

AUTOMOBILE Lamp and Dimmer—Comprising two semicircular plates attached to the burner for dimming the light.

This patent refers to the construction shown in Fig. 1 in which a dimmer is illustrated, comprising two substantially semicircular plates which overlap each other. These plates are supported by vertical shafts held in bearings of clamps which are secured to the burner. The clamping members carry means for rocking the shafts and thereby altering the relation of the dimming plates to the burner.

No. 1,034,536—to Francis H. Tobias, New York City. Granted August 6, 1912; filed October 23, 1911.

Spark-Plug Construction—Containing two electrodes in an insulator core, which are both connected to the original source of current.

This patent relates to a spark-plug as the one in Fig. 2, which consists of a core C of insulating material which in one place is shaped with an annular-expanding flange F. Above this flange a metal ring R and a bushing B surround the casing, the bushing being threaded externally. These threads engage the internal ones on the shell ring Q, which also has an external thread to fit into the motor cylinder head. Two electrodes E and E1 pass through the insulator core and their lower ends are bent to form a spark-gap, while their upper ends are equipped as terminals adapted for connection with current sources. A V-shaped recess S is formed above the spark-gap.

No. 1,034,835—to Lewis T. Rhoades, Mont Clare, Pa. Granted August 6, 1912; filed March 15, 1911.

Internal-Combustion Motor Starter—In which fuel is injected into the cylinder whose piston is arrested at a point of the power stroke.

The subject matter of this patent is a starter having a fuel supply receptacle and a communicating passageway leading to the cylinders of the explosive engine. Means are provided for arresting each of the engine pistons at a certain point of its power stroke. These means consist of a movable member connected with the engine crankshaft, which is in engagement with a stationary member yieldingly supported. By throwing movable and stationary members out of engagement and simultaneously injecting a portion of the fuel from the receptacle into the cylinder in which the piston is arrested, the engine is started.

No. 1,031,908—to James A. Brown and Carl G. Bosch, Cedar Rapids, Ia. Granted July 9, 1912; filed May 18, 1911.

Spring Shock-Absorber—Consisting of two curved springs, which are designed to check the recoil of the elliptical ones.

In Fig. 3 the subject matter of this patent is illustrated. The shock-absorber, which acts in conjunction with a semi-elliptic spring S and a C-shaped spring member S1 connected by a swing link L, consists of a spring S2 which has a compound curve and is attached at its middle portion to the spring S, and with its end portions to those of the latter. Another curved spring S3 has one end secured to the body of the car.

No. 1,034,231—to Philip Edward Haugh, Millvale, Pa. Granted July 30, 1912; filed February 16, 1912.

Spring Wheel for Automobiles—Consisting of spring-pressed plungers serving as spokes and a spring rim.

The idea of this patent is seen in Fig. 4. The wheel consists of an outer, or felloe, portion F and an inner portion I which are spaced from each other. In the felloe portion there are longitudinal tubes T, the side walls of which are partly cut away so as to form guideways in which a pivot pin P is adapted to travel. The tube contains springs S tending to hold the pivot pin in a central position by bearing against blocks which in turn bear against the pin P. Each pivot pin is in engagement with a driving plunger or spoke P1 which is slidably disposed in a guideway in the inner portion I of the wheel and is pressed outwardly by the spring S1.

No. 1,034,475—to Marius Mathiesen, San Antonio, Tex. Granted August 6, 1912; filed March 19, 1912.

Engine Primer—Consisting of a pump and suitable pipes and nozzles for injecting gasoline in spray form into the cylinders.

The priming attachment described in this patent consists of an elongated equalizing chamber which is adapted to contain gasoline under pressure and communicates with a distributer pipe. In communication with the distributing pipe are tubular members each of which contains a check valve and ends in a spray nozzle, one of them being arranged in the head of each cylinder and one in the intake manifold. The gasoline is drawn from the lead connecting the fuel tank and carbureter by means of a pump.

No. 1,030,931—to Eugene Silver, Omaha, Neb. Granted July 2, 1912; filed January 27, 1912.

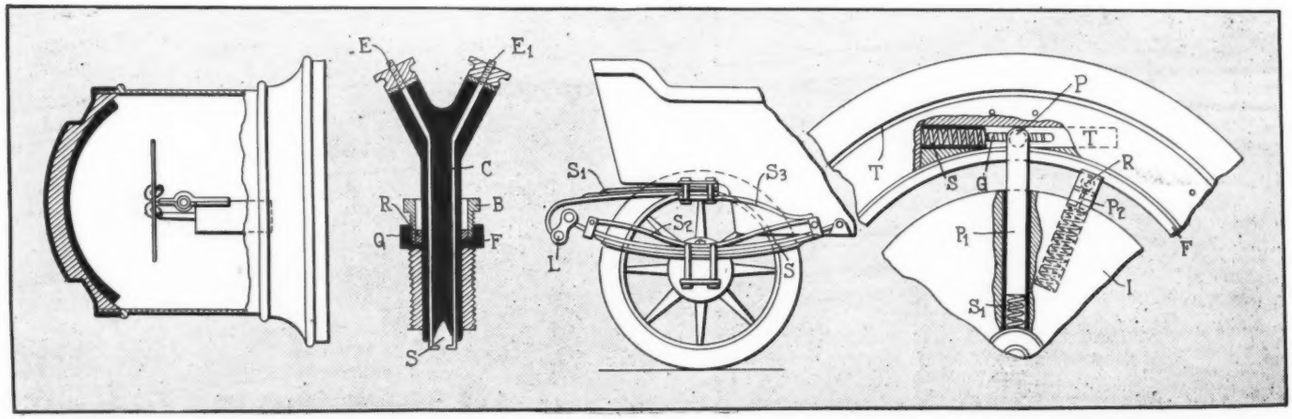


Fig. 1—Tobias lamp dimmer. Fig. 2—Rhoades Spark-plug. Fig. 3—Haugh shock-absorber. Fig. 4—Mathiesen spring wheel